COMMENTS ON EPA
HAZARD RANKING SYSTEM DOCUMENTATION RECORD
ANDREWS AIR FORCE BASE (AAFB)

SUBMITTED TO USEPA BY THE UNITED STATES AIR FORCE

9 October 1998

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LIST OF ACRONYMS AND ABBREVIATIONS

AAFB	Andrews Air Force Base
AWQC	Ambient Water Quality Criteria
AVS	Acid volatile sulfide
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of concern
CWA	Clean Water Act
DDD	4,4’-dichlorodiphenyldichloroethane
DDE	4,4’-dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane
DL	Detection limit
EPA	United States Environmental Protection Agency
FDA	United States Food and Drug Administration
ft^2	Square feet
HI	Hazard Index
HRS	Hazard Ranking System
HWQ	Hazardous Waste Quantity
IRP	Installation Restoration Program
LOR	Likelihood of Release
MCL	Maximum contaminant level
MDE	Maryland Department of the Environment
MEK	Methyl ethyl ketone
mg/kg	Milligrams per kilogram
NOS	Naval Ordnance Station
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
NWI	National Wetlands Inventory
PAH	Polynuclear Aromatic Hydrocarbons
PA/SI	Preliminary Assessment/Site Investigation
PCBs	Polychlorinated biphenyls
PCE	Tetrachloroethene
PCF	Potential Contamination Factor
PGCHD	Prince George’s County Health Department
POTW	Publicly owned treatment works
ppb	Parts per billion
PPE	Probable point of entry
ppm	Parts per million
RA	Health Risk Assessment
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SVOC	Semivolatile organic compounds
SWOFMC	Surface Water Overland/Flood Migration Component
T/P/B	Toxicity/Persistence/Bioaccumulation
TCE	Trichloroethene

TDL	Target distance limit
µg/L	Micrograms per liter
USACOE	United States Army Corps of Engineers
USGS	United States Geological Service
UST	Underground storage tank
VOC	Volatile organic compounds
WC	Waste Characterization
1,1,1-TCE	1,1,1-trichloroethene

SECTION 1.0

INTRODUCTION

Andrews Air Force Base
Hazard Ranking Score Review

Introduction

On July 28, 1998, the United States Environmental Protection Agency (EPA) proposed the Andrews Air Force Base (AAFB) for listing onto the National Priorities List (NPL). The EPA proposal allowed for a 60-day public comment period. During the public comment period the United States Air Force Headquarters Air Mobility Command performed an independent review of the AAFB Hazard Ranking System (HRS) Documentation Record. During that review, it was necessary to request a time extension. The EPA granted a two-week extension for the Air Force to provide comments, for reasons stated in a 15 Sep 1998 EPA letter, attached in Appendix K.

As a result of the independent review performed by Headquarters Air Mobility Command, the HRS Documentation Record has been found to contain many errors, including, most significantly, consideration of ineligible contaminants in calculating the HRS. It is acknowledged that contamination is present at the AAFB facility; however, thorough review of the HRS Documentation Record shows that the quantity, toxicity and concentration of contamination does not present a risk of exposure or potential exposure and, as such, does not present a hazard to human health or the environment.

As documented in the Appendices, EPA's scoring of the AAFB facility is based on consistent overvaluation of the actual or potential risks present at the site as well as a mechanistic application of the HRS formulas. As a result, the score does not accurately reflect the risks associated with the contamination present at AAFB, nor does it reflect the multimillion-dollar Installation Restoration Program (IRP) effort that has characterized the risks at the facility. Review of the areas affected by contamination at AAFB and of EPA's basis for scoring the facility indicates that the AAFB facility does not qualify for the National Priorities List (NPL).

The EPA evaluated five sources on AAFB as contributors to the contamination in Piscataway Creek through the surface water migration pathway; however, the surface water contamination in Piscataway Creek results from deposition from aircraft emissions. Because aircraft emissions, as discussed below, are exempt from the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), scoring AAFB using polynuclear aromatic hydrocarbons (PAHs) and lead is inappropriate and provides inaccurate results. Furthermore, other salient conditions compel EPA to assess the facility outside the NPL framework:

- CERCLA exempts lead and PAHs generated by aircraft emissions from the definition of hazardous substances; PAHs and lead are deposited on surface soils and runways by aircraft emissions at AAFB and should not have been considered in scoring the facility.

- Andrews AFB, through its IRP, performed Remedial Investigations (RIs) and Health Risk Assessments (RAs) in accordance with procedures prescribed in the National Contingency Plan and EPA guidance documents.

- Andrews is currently in the process of prioritizing future remedial actions in accordance with findings provided in the RIs and RAs performed at AAFB.

- Numerous documents generated by AAFB were cited by EPA to produce a HRS score above the threshold of 28.5; however, none of the cited documents were used by EPA to determine the risks of the contaminants. There exists an opportunity for EPA to comprehensively assess the environment at AAFB by reviewing documents produced through the IRP.

The predominant source for contamination at the facility is lead and PAHs from aircraft emissions, which are ubiquitous at AAFB due to historical aircraft activity, and are conveyed by surface water runoff from the runways. While regulated under other federal environmental laws, specifically the Clean Water Act (CWA) and the Resource Conservation and Recovery Act (RCRA), these contaminants are exempted from regulation under CERCLA on two independent bases. First, CERCLA, Section 101(14), 42 U.S.C. 9601(14), categorically excludes aircraft emissions from the definition of “release”. Second, the lead and PAHs, as well as other metals present as a result of jet fuel combustion, are “petroleum” as defined under CERCLA, and thus are excluded from the definition of “hazardous substance”. The lead and PAH contamination that results from surface water runoff of flightline deposition at AAFB is excluded entirely from CERCLA response and liability; therefore, EPA should not include this source of lead and PAH contamination in its scoring.

The Air Force is committed to protecting the environment from residual contamination both on- and off-site at AAFB. The historical IRP activities at AAFB are consistent with the NCP Remedial Program. Risk assessments performed in 1993 (HRS Documentation Record, Ref. 4) and 1995 (HRS Documentation Record, Ref. 32) concluded that there was no unacceptable risk to human health or the environment associated with exposure to compounds in Piscataway Creek and surrounding areas. A comparison of the HRS with the more detailed health risk analyses shows that AAFB considered impacts to the creek long before the HRS Documentation Record was used to score the facility. To date, the Air Force has spent approximately $1.7 million on the five sources listed in the AAFB HRS Documentation Record. This demonstrates the Air Force’s efforts to ensure that AAFB does not present a threat to human health or the environment.

The data herein indicate that the contaminant loading to Piscataway Creek results from surface water runoff from the runways, taxiways, and aprons at AAFB, and thus, cannot be the basis for response activities under CERCLA. Instead, the National Pollutant Discharge Elimination System (NPDES) permit program, implemented under the Clean Water Act (CWA), could become the mode of enforcement for limiting discharges to Piscataway Creek and, if necessary, for taking actions to clean up the creek on AAFB. This is the regulatory framework for which action should be taken at AAFB because of the level of effort the Base has already invested in defining potential areas of concern and because of its readiness to implement preventive measures and pollution control at the facility.

In conclusion, based on data presented herein and exemption of aircraft emissions from the definition of a release, the HRS score is 23.51, which is less than the threshold of 28.5 needed to qualify for the NPL. The PAH and lead concentrations, as well as any other concentration of constituents that are discharged to Piscataway Creek, can be addressed by AAFB through the NPDES program.

SECTION 2.0

SUMMARY OF REVIEW

Summary of Review

Review of the HRS Documentation Record, plus additional relevant documents available to but not evaluated by EPA, indicates that EPA's application of the HRS to AAFB was inappropriate. The purpose of the HRS is to "....serve as a screening device to evaluate the relative potential of uncontrolled hazardous substances to pose a threat to human health or the environment (40 CFR Part 300)". The HRS is a formulaic means for prioritizing estimated risks prior to thorough evaluation using more precise tools, such as RIs and risk assessments. It was inappropriate for EPA to rely solely on the HRS to evaluate the risks posed by contamination at AAFB because the RI and risk assessment have already been performed. Thus, EPA has available a vast quantity of data regarding the contamination levels and risks of exposure at AAFB that would not normally be available for a site that is screened using the HRS. Rather than rely on strict application of the HRS, EPA also should evaluate the already existing data produced under the IRP over the past ten years. These data show clearly that risks due to exposure at AAFB do not justify listing the site on the NPL.

The HRS evaluates four potential pathways of contamination related to the release or threat of release from a facility: groundwater, surface water, soil exposure, and air. The groundwater, soil exposure and air migration pathways were not evaluated for AAFB, as these pathways would contribute minimally to the score. Five sources on AAFB were evaluated as contributors to the contamination in Piscataway Creek through the surface water migration pathway. These sources are in the same watershed, potentially affect the most targets, and therefore have the potential to substantially contribute to the score for the surface water migration pathway. Review of the data available for each of the sources shows that no unacceptable risks are present from exposure due to these sources. A rescore of the HRS also was conducted based on available data. The rescore of 23.51, showing why AAFB should not be listed on the NPL, is provided in Appendix B. The rescore documentation is provided in Appendix C.

Basis for Rescore

The sources evaluated in the HRS Documentation Record include two fire training areas (Sources 1 and 2), a municipal sewage sludge storage area (Source 3), and three landfills (Sources 4 and 5); Landfills 6 and 7 are evaluated together as Source 5. The HRS Documentation Record has been found to contain many errors, including the contribution of contamination by the sources discussed above. Other facts associated with PAH and lead data for use in the HRS need to be considered. Appendix D of this report demonstrates that the source of lead and PAH contamination is from aircraft exhaust, which is exempt from being included as a CERCLA hazardous substance. Appendix E demonstrates that sludge, containing lead, was applied to AAFB in accordance with regulations (40 CFR 503.13, Subpart B) for application of sewage sludge for residential land-use. Appendices F and G summarize the risk associated with Sources 4 and 5, respectively; Appendix H shows the Piscataway Creek flow recalculation. Appendix I contains two figures: the first is AAFB and the August 1998 sampling locations, and the second is the recalculated area of Source 5. Appendix J presents the August 1998 sampling results.

Source 1 (also known as FT-02) was used from the early 1950s until 1958 as a fire training area. Here, too, PAH generated by combustion of petroleum is exempt from the definition of a

CERCLA hazardous substance. This source is now buried under three feet of concrete adjacent to the west runway. There is no potential for surface water overland-, or flood-migration of contaminants from this source, and thus, there is no risk due to exposure to contamination at FT-02. Therefore, Source 1 can be removed as a source of contamination.

Source 2 was also used as a fire training area from the early 1950s until 1958. Currently, however, Source 2 is covered by a golf course. As documented in Appendix A (Comment 10), the golf course acts to stabilize the site. In addition, the golf course maintains a runoff management system. The fire training area is no longer a source of exposure, and therefore, does not present any risks.

Source 3 also can be eliminated from consideration. Sewage sludge was applied to land between the runways (as depicted in the HRS Documentation Record) and at the north and south end of the runways, as depicted on the figure in Appendix I, to raise the topography near the runways. The sludge allegedly contained zinc, lead, chromium, copper, and cadmium at levels slightly above those typically found in native soils, although no previous sampling results are available. In August 1998, samples were collected (IT Corporation, August 1998) in areas where sludge had been applied. The data (EMAX Laboratories Inc., September 1998) located in Appendix J were used to compute the kilograms per hectare of each metal present in the soil. Appendix E lists the results and associated regulatory limits. As shown in Appendix E, Source 3 metals are within acceptable sewage sludge land-application limits according to 40 CFR 503.13, Subpart B. The average metal concentration in the soil is also below the benchmark concentrations. Therefore, no risk is present at Source 3 and it too can be removed as a source of contamination.

Three to five feet of clean cover material have been applied over the debris landfill at Source 4. The Contaminants of Concern (COCs) present no potential for direct exposure risks. Samples collected (from Piscataway Creek or downgradient or in its tributary) show that the Source 4 COCs have not been measured above the expected background levels in Piscataway Creek, thus demonstrating that Source 4 presents no risk due to exposure from surface water runoff (HRS Documentation Record, Ref. 38).

A statistical analysis (Appendix D-3) performed on the lead and PAH data from the surface soil samples that were also collected in August 1998 shows that the predominant source of lead and PAH in Piscataway Creek is surface water runoff from the runways, taxiways, and aprons via storm sewers. The statistical review indicates that the highest concentrations of these contaminants are in surficial, rather than subsurface soils, thus confirming that the sources for lead and PAH are aircraft emissions and surface water runoff from the runways rather than the five sources evaluated by EPA. Lead and PAH are exempt from CERCLA regulation because they are components of aircraft exhaust (Appendix D-1). Based on the analyses summarized above and documented in detail in the rescore (Appendix C), AAFB scores at 23.51 (Appendix B).

APPENDIX A

COMMENTS

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APPENDIX FORMAT AND STYLE

1. The format follows the numerical index presented by EPA in the HRS Documentation Record for AAFB.

2. Statements made by EPA are in italics.

3. Air Force comments follow the quoted EPA statements. There are two types of comments: corrections and clarifications. "Corrections" rectify erroneous statements and/or misquoted references. "Clarifications" provide additional support to statements made in the HRS Documentation Record that were taken out of context from the reference documents used preparing the Record. These clarifications and corrections reflect an impartial attempt to increase the accuracy of the HRS Documentation Record for AAFB.

POINT-BY-POINT COMMENTS

HRS Heading: REFERENCES

1. **HRS Statement:** "*Reference 41*".
   Clarification: Throughout the HRS Documentation Record, the EPA cites "*Reference 41*"; however, the HRS Documentation Record does not contain a "*Reference 41*". The correct citation is Reference 12.

HRS Heading: SOURCES EVALUATED AND POTENTIAL SOURCES

2. **HRS Statement:** Page 8, "*Table 1, Potential Sources*".
   Clarification: The inclusion of these sources in Table 1 can not be evaluated because of insufficient data. Furthermore, data used in the HRS Documentation Record are either not current and/or not representative of the actual conditions. Although these sites do not directly affect the scoring, the information contained in Table 1 is indicative of the extent to which EPA's evaluation is based on inaccurate information.

   Throughout the Scoring Package, much emphasis is put on the Phase I Records Search (HRS Documentation Record, Ref. 3). Many of the potential sources identified in that study have been investigated further since the time the document was finalized according to Reference 3 (1985). In fact, several of the potential sources listed in Table 1 as not being evaluated because of insufficient data were further evaluated as part of the 1995-96 PA/SI (HRS Documentation Record, Ref. 26). For example, Site SP-3 (JP-4 Spill), known as Site SS-12 for some time, was investigated during the PA/SI. Nine soil samples were collected and submitted for the full EPA Contract Laboratory Program (CLP) volatile, semi-volatile, pesticide/PCBs, and inorganic analysis (HRS Documentation Record, Ref. 26, Section 6.4).

   Other sites listed in Table 1 where further investigation has occurred include Site RWD-1 (radioactive waste storage site, also known as AOC-23); the Disposal Pits (known as AOC-

27); and the Buried Gasoline Storage Cans. Geophysical surveys were conducted at these three sites during the PA/SI (HRS Documentation Record, Ref. 26, Sections 6.5, 6.6, and 6.7, respectively). In addition, test pits were dug at the Buried Gasoline Storage Cans Site, which was reported near site FT-03 (HRS Documentation Record, Ref. 26, Section 6.7.3).

3. **HRS Statement:** Page 9, "*Figure 2, Source Location Map*".
   Correction: Location of Source 1 is incorrect. The location shown is correct according to the references cited on the figure, but this location was proven to be incorrect during the 1995-96 PA/SI (HRS Documentation Record, Ref. 26, p. 4-122). The correct location is discussed in Reference 26, Sections 4.10 (p. 4-122) and 3.2.9 (p. 3-34), and is shown in Figure 2.2-1 (p. 2-4), and Figure 3.2.9-1 (p. 3-35).

HRS Heading: 2.2 Source Characterization (Source 1)

4. **HRS Statement:** Page 16, Para.1: *"Source 1 is located in the south-central part of AAFB in the southwest portion of the flightline area (Figure 3) (Ref. 3, Figure 4.5, p. 4-37; Ref. 11; Ref. 16, p. 2-40 and Figure 2.2.10.1-1, p. 2-41)."*
   Correction: The location described is incorrect. The references cited are outdated by Reference 26, which is not cited.

5. **HRS Statement:** Page 16, Para. 5: *"There is no maintained, engineered cover or functioning and maintained runon control system and runoff management system; Source 1 is located in a depression (Ref. 16, Figure 2.2.10.1, p. 2-41, p. 2-43, and p. 4-38). In addition, Source 1 is situated on natural soil (Ref. 3, p. 4-38). Therefore, a containment value of 10 is assigned (Ref. 1, Table 4-2, p. 51609)."*
   Correction: The EPA's entire discussion is incorrect because Reference 26 showed the correct location of Source 1 to be beneath Taxiway 6 (HRS Documentation Record, Ref. 26, p. 4-122). The assigned containment value is incorrect and should reflect the fact that Source 1 is capped by approximately two feet of concrete.

6. **HRS Statement:** Page 17, "*Figure 3, Source 1, Fire Training Area 1*".
   Correction: Again, the location of Source 1 is incorrect. In addition, the location depicted in this figure is not consistent with the location shown in the source referenced. Neither is the location shown in Figure 3 consistent with the incorrect location in Figure 2 (HRS Documentation Record, p. 9).

HRS Heading: 2.4.1 Hazardous Substances

7. **HRS Statement:** Page 18, "*Table 2, Hazardous Substances in Source 1*".
   Correction: Soil sampling was conducted at Source 1 (HRS Documentation Record, Ref. 26, Section 6.3). Twenty-one samples were collected and submitted for the full CLP volatile, semi-volatile, pesticide/PCBs, and inorganic analyses. Trace levels of three hazardous substances (di-n-butylphthalate, butylbenzyl phthalate and Aroclor-1260) listed in Table 2 were detected and are indicated in the table as "soil sample" in the evidence column. Five hazardous substances listed in the table (1,1,1-TCA, carbon tetrachloride, chlorobromomethane, MEK, and toluene) were not detected in any soil sample collected at Source 1. It is erroneous to include these substances on Table 2 as "recorded use" evidence. Wherever possible, scoring should be based on the best available and most specific data

(EPA, The Hazard Ranking System Guidance Manual, pp. 26-28, November 1992). "Recorded use" evidence should not be used when sample results clearly show that these substances were analyzed for and their presence not detected.

8. **HRS Statement:** Page 18, "*Table 2, Hazardous Substances in Source 1*".
   Correction: Reference 26, p. 10, refers to site SS-12 and a JP-4 spill, rather than site FT-02: Fire Training Area No. 1, as depicted in the table.

HRS Heading: 2.2 Source Characterization (Source 2)

9. **HRS Statement:** Page 25, Para. 4: *"It is currently used as a soccer field (Ref. 25, p. 3)."*
   Correction: Andrews AFB confirmed that a golf course currently covers this site (9/98).

HRS Heading: 2.2 Containment

10. **HRS Statement:** Page 26, Para. 1: *"There is no functioning and maintained run-on control system and runoff management system; the source is covered with soil and stabilized sewage sludge (Ref. 3, p. 4-38)."*
    Correction: Andrews AFB confirmed that no stabilized sewage sludge was deposited at this site. However, the site is covered by a golf course. During construction of the golf course approximately 6,500 square feet of clean fill was placed over Source 2 to make final grades. The fill was compacted to Class 3 specifications, which is 85% compaction. The golf course is vegitatively stabilized by the greens and drains well. It is incorrect to state that there is no functioning run-on control system and runoff management system at this site.

11. **HRS Statement:** Page 26, Para. 6: *"Therefore, a containment value of 9 is assigned (Ref. 1, Table 4-2, p. 51609)."*
    Clarification: Page 26 lists a containment value of 9 for Source 2. Page 63, Summary of Site Source Descriptions table, lists a containment value of 10 for Source 2.

HRS Heading: 2.4.2.1.2 Hazardous Wastestream Quantity

12. **HRS Statement:** Page 30, Para. 1: *"As a point of reference, based on the information provided in the IRP Phase I report, a conservative Wastestream quantity was calculated assuming 1,000 gallons per exercise (the IRP estimates as much as 1,000 to 2,000 gallons) for 1.5 training exercises per day (the IRP estimates a maximum of 2 to 3 per day) for a conservative estimate of 5 years (1959 to 1965)."*
    Correction: Andrews AFB confirmed that the correct number of training exercises is 4 per year, rather than 1.5 training exercises per day (8/98). See corrected calculation below:

    1960 to 1964, inclusively = 5 years
    1,000 gallons per exercise x 4 per year = 4,000 gallons per year
    4,000 gallons per year x 5 years = 20,000 gallons for the years 1960 to 1964

    1967 to 1971, inclusively = 5 years
    1,000 gallons per exercise x 4 per year = 4,000 gallons per year
    4,000 gallons per year x 5 years = 20,000 gallons for the years 1967 to 1971

Total

20,000 gallons (1960 to 1964) + 20,000 gallons (1967 to 1971) = 40,000 gallons were ignited

HRS Heading: 2.2 Source Characterization (Source 3)

13. **HRS Statement:** Page 36, Para. 1: *"No other sludge samples were collected during disposal operations or recent site investigations. Sludge was also applied in two other, much smaller areas, including the vicinity of FT-2 (Source 2) and some in Source 4 (Ref. 3, pp. 4-49 and 4-52, and Figure 4-10, p. 4-51; Ref. 38, pp. 1-3 and 1-6)."*
Correction: The information contained in the last sentence of the HRS document is misleading. To begin, the statement *"No other [emphasis added] sludge samples were collected during disposal operations or recent site investigations. Sludge was also applied in two other, much smaller areas, including the vicinity of FT-2 (Source 2) and some in Source 4"* implies that at least some samples were collected of the wastewater treatment plant sludge that was applied to the land at the Base. Andrews Air Force Base is unaware of, and possesses no data for, any sludge samples that were collected at AAFB. In addition, in the context of Paragraph 1, EPA's statement *"Sludge was also applied in two other, much smaller areas, including the vicinity of FT-2 (Source 2) and some in Source 4"* implies that the sludge applied at Source 4 (i.e., LF05) originated from the Blue Plains Waste Treatment Plant, which is the main publicly owned treatment works (POTW) for Washington, D.C. Reference 38 states that this sludge originated from a *"waste treatment operation at the Base"*. Reference 38 also states that sludge application at LF05 occurred *"During the late 1950s and 1960s"* rather than *"During the late 1960s and early 1970s"* as stated in the first sentence of the paragraph in the HRS document. Note that Reference 3 is the original source of the information attributed to Reference 38.

14. **HRS Statement:** Page 36, Para. 1: *"Sludge was applied in lifts of up to 24 inches (Ref. 3, p. 4-49 and Figure 4-10, p. 4-51)."*
Correction: Sludge was applied in lifts of six inches (HRS Documentation Record, Ref. 3, p. 4-49).

15. **HRS Statement:** Pages 36 and 39, Source Characterization. The HRS Documentation Record lists the sludge application area as a source (Source 3).
Correction: The area where sludge was spread is not a source of contamination. Samples were taken in August of 1998 in areas where sludge had previously been spread. The contaminants listed in Table 6, page 39, are within acceptable concentrations and cumulative pollutant loading rates as listed in 40 CFR Section 503.13, Pollutant Limits. In addition, the concentrations are below the benchmark soil exposure concentrations listed in Reference 2, the Superfund Chemical Data Matrix (SCDM). Appendix I shows a map of these locations; Appendix E shows the calculations.

HRS Heading: 2.4.1 Hazardous Substances

16. **HRS Statement:** Page 39, Para. 1: *"However, concentrations of zinc, lead, chromium, copper, and cadmium were detected in samples of Blue Plains Waste Treatment Plant sludge generated from 1982 to 1984; in the late 1960s and early 1970s, sludge from this plant was deposited in Source 3 (Ref. 3, p. 4*-52)."

<u>Clarification:</u> The following statement from Reference 3, p. 4-52 was left out of the HRS document record. "However, analysis of this material has shown that it is acceptable for landfarming. Blue Plains sludge is currently landfarmed at many locations throughout the District of Columbia and Maryland. The sludge application sites were not considered to hold a potential for environmental contamination." In addition, the calculations in Appendix E show that the concentration of metals in the soil are within acceptable landfarming concentrations and loading rates.

HRS Heading: 2.2 Source Characterization (Source 4)

17. **<u>HRS Statement:</u>** Page 44, Para. 2: *"In the 1950s and 1960s, sludge from the AAFB waste treatment plant was spread on the eastern part of Source 4. The sludge was spread in lifts of up to 6 inches and worked into the soil (Ref. 38, p. 1-6)."*
    <u>Correction:</u> The original source of the information attributed to Reference 38 is Reference 3.

18. **<u>HRS Statement:</u>** Page 44, Para. 3: *"About 2,000 gallons of these wastes were disposed of in the pit each week (Ref. 38, p. 13)."*
    <u>Correction:</u> This is a misrepresentation of the information presented in Reference 38. Reference 38 states *"Generally, one 2,000 gallon tank truck of waste was delivered to the site each week."* The EPA assumes that each waste delivery is 2000 gallons. Andrews Air Force Base confirmed that, although the exact volumes of each delivery are unknown, 2000 gallons per week is too high. Note that Reference 3 is the original source of this information.

19. **<u>HRS Statement:</u>** Page 44, Para. 3: "*Landfill LF-05 has been subject to flooding; on several occasions, the contents of the pit were swept away with flood waters of Piscataway Creek located about 100 feet east of Source 4 outside the AAFB Boundary (Ref. 10, p. 37; Ref. 39, p. 3-1).*"
    <u>Correction:</u> This sentence is correctly cited, but is nonetheless inaccurate. The original source of this information is Reference 3. This statement was removed from later documents concerning LF05 such as the <u>Technical Memorandum of Findings, Site LF05 Investigation</u> dated November 1994. The statement concerning flooding was deleted because (1) LF05 is located on a topographic high for the local area and (2) gravel quarries are located to the east of LF05 – not Piscataway Creek. The EPA incorrectly states that Piscataway Creek is located 100 feet east of Landfill LF-05. Piscataway Creek is located approximately 5000 feet south west of Landfill LF-05. A small, unnamed tributary to Piscataway Creek is located east of Landfill LF-05. This tributary flows for approximately one mile before it enters Piscataway Creek. The original information from Reference 3 is totally inaccurate and should not be used in EPA's assessment.

20. **<u>HRS Statement:</u>** Page 44, Para. 4: *"In the mid-1970s, two 25,000-gallon USTs were installed on the northwestern side of the source to replace the waste pit. Since the mid-1970s, most of the liquid wastes placed in the USTs have been waste oils. The waste oils were pumped out of the USTs by an offsite contractor for recycling and recovery (Ref. 39, p. 3-1)."*

Comments: The EPA failed to document whether the USTs are still in place or have since been removed. If these USTs have been removed, they can not be considered continual sources of contamination as implied by this statement. Note that the original source of the information attributed to Reference 39 is Reference 3.

21. **HRS Statement:** Page 45, Para. 1: *"Soils excavated as a result of the runway expansion conducted in summer and fall 1992 were stockpiled in the northeastern quadrant of the landfill after remedial investigation sampling was conducted at the landfill (Ref. 38, p. 4-8). As a result, any contamination that may have been associated with the soils in the vicinity of the runways might now be at the new location of these soils in Source 4."*
    Clarification: There is no evidence to suggest that the stockpiled soils were contaminated.

22. **HRS Statement:** Page 45, Para. 2: *"In the early 1980s, the eastern side of Source 4 was used for disposal of grease generated in the waste treatment plant (Ref. 38, p. 1-6). The area previously used to dispose of sludge and grease is now covered with vegetation (Ref. 38, pp. 1-3 and 1-6)."*
    Clarification: The original source of the information attributed to Reference 38 is Reference 3.

23. **HRS Statement:** Page 45, Para. 4: *"During an initial site investigation of Landfill LF-05 conducted by USGS in 1988 and 1989, barium, volatile organic compounds (VOC), and semivolatile organic compounds (SVOC) were detected in groundwater samples (Ref. 38, pp. 1-6 and 1-7). Metals, VOCs and SVOCs were also detected in soil samples (Ref. 38, pp. 1-6 and 1-7). Problems with the laboratory quality control procedures restrict the use of the sample data to qualitative purposes only (Ref. 41, p. 2-3)."*
    Correction: Reference 38 does not identify any SVOC analyses conducted by the USGS on soil samples. Reference to SVOC analysis performed on the soil sample collected by USGS is incorrect.

24. **HRS Statement:** Page 47, Para. 4: *"Source 4 is now covered with several feet of local soil (Ref. 39, p. 3-1). Because Source 4 has neither a maintained, engineered cover nor a functioning, maintained runon control system and runoff management system, a containment value of 10 is assigned (Ref. 1, p. 51609; Ref. 39, p. 3-1)."*
    Page 26, Para. 6: *"There is no functioning and maintained run-on control system and runoff management system; the source is covered with soil and stabilized sewage (Ref. 3, p. 4-38). Therefore, a containment value of 9 is assigned (Ref. 1, Table 4-2*, p. 51609)". Page 55, Para. 5: *"Source 5 appears to have been covered with fill or soil and seeded, however, no functioning and maintained run-on control system and run-off management system has been documented for the source (Ref. 6, p. 3-1; Ref. 5, p. 3-1; Ref. 17, p. 1). Therefore, a containment value of 9 is assigned (Ref. 1, p. 51609)."*
    Clarification: The EPA's assignment of containment values is not consistent. These sources should have the same containment value of 9. Source 2 is covered with soil and stabilized sewage sludge. Source 4 is covered with several feet of local soil. Additionally, the sewage sludge referenced above is the same sewage sludge in Source 3. The sludge appears to have lowered the containment value. Whereas, the same sludge is listed as a source of contaminants in Source 3, which has a contaminant value of 10.

HRS Heading: 2.4.1 Hazardous Substances

25. **<u>HRS Statement:</u>** Page 48, Para.1: *"Hazardous substances associated with Source 4 are listed in Table 7 below along with the identification numbers of surficial soil samples in which they were detected. The soil samples were collected by Dames & Moore during the 1992 remedial investigation at Landfill LF-05 (Ref. 38, p. 3-3)."*
    <u>Correction:</u> The location where these samples were collected is now covered with several feet of soil, making these samples invalid for characterizing surface soil conditions. The source of the fill was the material cut for the runway expansion. Thus, lead and PAH, contaminants that are excluded from CERCLA regulation (Appendix D-1), have been introduced at Landfill LF-05.

26. **<u>HRS Statement:</u>** Page 48, Table 7
    <u>Correction:</u> The list of *"Hazardous Substances in Source 4"* presented in Table 7 includes three metals – barium, copper, and vanadium – detected in soil within the typical range of background concentrations for Maryland soil. Typical concentrations for metals in soil are presented on page 4-18 of Reference 38.

HRS Heading: 2.2 Source Characterization (Source 5)

<u>General Statements</u>
In some instances, specifically References 4, 32 and 33, the HRS Documentation Record references draft documents even when final documents are available. The final version of the Reference 4, Assessment of Impacts of Landfills LF-06 and LF-07 on Piscataway Creek and Surrounding Area, December 1993, is available. The final versions for References 32 and 33, the Piscataway Creek Remedial Investigation Report, Volume I (Text) and Volume II (Appendices) dated April 1995, are also available. While these documents are not substantially different, it is more appropriate to use the final versions of these documents.

In numerous instances throughout the HRS Documentation Record, data included in References 4 and 32 are presented as evidence of an observed release; however, References 4 and 32 include human health risk assessments which EPA does not appear to have considered. The risk assessments in both documents conclude that the risks associated with LF-06 and LF-07 are acceptable (Appendix G). Therefore, use of the data without consideration of the risk assessment may lead the uninformed reader to conclude that there are great risks associated with these sites. In this manner, many of the statements in the HRS Documentation Record are misleading.

27. **<u>HRS Statement:</u>** Page 53, Para. 1, 2, and 3: "Because of the proximity to each other, they affect similar target populations, have similar containment values, have similar wastes disposed of in them, and had similar operations while they were active (Ref. Pp., 4-2 and 4-44; Ref. 39, pp. 4-1, 4-2, 4-2, 5-1, and 5-3) . . . In addition, unknown quantities of liquid waste from the base shops (waste oils, paint thinners, and cleaning solvents) were disposed of at this location (Ref. 3, p. 4-44; Ref. 39, p. 4-1). As recently as 1984 or 1985, items such as the following were found in the landfill: old furniture, washing machines, metal lockers, sheet and scrap metal, household garbage, plastics, empty 55-gallon drums, waste lumber,

tires, pipes, and hospital wastes such as unused needles and chemical reagents (Ref. 3, p. 4-44; Ref. 6, p. 3-1; Ref. 39, p. 5-1)."
Clarification: The original source of the information attributed to References 6 and 39 is Reference 3.

28. **HRS Statement:** Page 53, Para. 4: *"A firing range was located in the lower southeast portion of Landfill LF-07. As of 1994, no structures remained on the firing range (Ref. 32, pp. 3-2 and 3-5)."*
Correction: The second page referenced should have been 3-6, rather than 3-5.

29. **HRS Statement:** Page 54, Para.1: *"Wetlands are located on several swales that cross over the source (Ref. 32, Figure 3-19, preceding p. 3-23)."*
Clarification: Several drainage swales cross over an area of disturbed ground identified in aerial photographs that are not wetlands and are not "the source" mentioned in the EPA document. In addition, the surface topography has changed. A golf course now covers Landfill 07.

30. **HRS Statement:** Page 54, Para. 2: *"During an initial site investigation for Landfills LF-06 and LF-07 conducted by USGS in 1988 and 1989, various metals, pesticides, and SVOCs were detected in soil and groundwater samples (Ref. 4, p. 1-5; Ref. 17, p. 5; Ref. 18, p. 5)."*
Correction: The EPA scoring document states that pesticides were detected in soil and groundwater samples. The 1993 EA report cited by EPA (HRS Documentation Record, Ref. 4) does not list pesticides as an analytical parameter; thus, the HRS Documentation Record incorrectly states that pesticides were detected in soil and groundwater samples.

31. **HRS Statement:** Page 54, Para. 3: *"Investigations conducted in 1994 identified tetrachloroethene (PCE) in surficial soils in the northern LF-06 and southern LF-07 portion of Source 5. Follow-up analyses ruled out any error in the analysis of the surficial soil samples (Ref. 32, pp. 4-2, 4-3, 4-6 through 4-8, and Figure 4-1 following p. 4-2)."*
Clarification: Although the analysis for PCE in surface soil samples was confirmed by further analysis, it is also significant that three locations showed no detectable levels of PCE. PCE was reported in surface samples collected throughout LF-06 and LF-07. Because PCE is a volatile compound, its widespread occurrence in surface soil samples was thought to be evidence of spurious data. Therefore, re-sampling was conducted. EA stated that "no explanation can be determined" for the anomalous data. The data were included in the risk assessment portion of the report (HRS Documentation Record, Ref. 32).

32. **HRS Statement:** Page 55, Para.1: *"Source 5 is in the southern portion of AAFB and lies north and south of South Perimeter Road. Source 5 is bordered by an active trap and skeet range to the north and a fire training area to the west (Figure 7) (Ref. 32, p. 3-2 and Figure 3-1 following p. 3-2); Landfill LF-07 is bordered by Piscataway Creek (Ref. 31, p. 19)."*
Correction: Only LF-06 is abutted by a trap and skeet range to the north and adjacent to a fire training area to the west. LF-07 is abutted by South Perimeter Road to the north and Base Lake to the west. The trap and skeet range is now only marginally operational. Antimony has been applied to this area to harden the lead shot from 25-30 years of use. Antimony will prevent the lead from leaching to the subsurface.

33. **HRS Statement:** Page 55, Para. 5: *"Source 5 appears to have been covered with fill or soil and seeded, however, no functioning and maintained run-on control system and run-off management system has been documented for the source (Ref. 6, p. 3-1; Ref. 5, p. 3-1; Ref. 17, p. 1)."*
Clarification: This statement is misleading. While References 5 and 6 do not describe run-on and run-off control *"systems,"* it is inappropriate to conclude that such systems do not exist. Run-off is now managed by the golf course.

HRS Heading: 2.4.1 Hazardous Substances

34. **HRS Statement:** Page 57, Para. 1: *"Hazardous substances associated with Source 5 are listed in Table 8 below along with the identification numbers of surficial and subsurface soil samples in which they are detected. The samples were collected by EA during the Piscataway Creek Phase II remedial investigation in 1994 (Ref. 32, pp. 2-5 through 2-7)."*
Correction: Table 8 is a selective listing of compounds and analytes detected in soil samples during the Phase II RI (EA 1995). The listing for PCB (Aroclor 1254) is actually A-LS-SS-12-C-0000. It was mislabeled in the RI analytical result table. The basis for EPA selecting the compounds for Table 8 is unknown. Furthermore, the RI Report (HRS Documentation Record, Ref. 32) includes a human health risk assessment that evaluates the risks associated with exposure to surface soil. The risk assessment concluded that the risks are acceptable, with the possible exception of one pathway (inhalation of soil particles) and one compound (manganese), which may present an elevated risk for residential land use.

35. **HRS Statement:** Page 57, Para. 1: *"The soil and background sampling locations are shown in Ref. 32, Figure 4-1, preceding page 4-2."*
Correction: The EPA's citation is incorrect. In Reference 32, Figure 4-1 actually precedes page 4-7 rather than page 4-2.

HRS Heading: 2.4.2.1.4 Area

36. **HRS Statement:** Page 61, Para. 1: *"Landfill LF-06 covers about 28 acres, and Landfill LF-07 covers about 60 acres (Ref. 32, pp. 3-2 and 3-3). Therefore, the area of Source 5 is 88 acres. The square footage of Source 5 is calculated as shown below."*
Correction: The EPA's calculation is incorrect. The area of the landfills was based on the maximum area of disturbed ground identified on historical aerial photographs. Based on the results of the geophysical survey, anomalies could be used to estimate a smaller LF-06 area (which had adjacent anomalies indicative of a fill area) and a smaller LF-07 area (which had separate anomalies indicative of spot filling). Using the maximum area of disturbed ground identified on historical aerial photographs in 1974 and results of the geophysical survey, the total area of LF-06 and LF-07 would be 15 acres and 31 acres respectively for a total of 46 acres. See the corrected calculations below and Appendix I for a figure of the recalculated area.

46 acres x 43,560 ft^2/acre = 2,003,760 ft^2

A waste quantity divisor of 3,400 for landfills is used to calculate the area value shown below (Ref. 1, Table 2-5, p. 51591).

2,003,760 ft^2 / 3,400 = 589.34

Area of Source (ft^2): 2,003,760
Reference: 32, pp. 3-2 and 3-3
Area Assigned Value: 589.34

37. **HRS Statement:** Page 64, Para.1: "Artificial structures and various activities have disturbed the natural source of the creek (groundwater seeps and springs), and Piscataway Creek begins as an open channel south of the runways that receives surface water drainage from the runways and hangar complexes (Ref. 4, p. 1-4; Ref. 32, pp. 3-1 and 3-23; Ref. 8)."
Correction: Reference 32 contains a discussion of the piping of the Piscataway Creek headwaters rather than upstream surface water drainage.

HRS Heading: 4.1.1.1 Definition of Hazardous Substance Migration Path for Overland/Flood Component

38. **HRS Statement:** Page 65, Para.1: *"Surface water runoff from Sources 1 (also known as Fire Training Area FT-1) and 3 (sludge disposal area) combine in the storm water drainage system (Ref. 28)."*
Correction: This statement is incorrect. Reference 26 documented that FT-1 is located beneath Taxiway 6 and is effectively capped by the concrete taxiway, and thus, there is no surface water runoff from Source 1.

39. **HRS Statement:** Page 65, Para.1: *"The PPE for Source 4 (also known as disposal site D-1) is at the upstream end of the unnamed tributary that discharges into Piscataway Creek (Ref. 13; Ref. 10, pp. 36 and 37; Ref. 28; Ref. 38, pp. 1-4, 2-4, and 6-19)."*
Correction: This statement implies that Source 4 discharges into Piscataway Creek and is therefore misleading. Reference 38 actually states that *"In general, site runoff flows toward and is probably intercepted by the off-base gravel quarries"*. Reference 38 dismisses potential transport of contamination to Piscataway Creek given the distance of the site to the Piscataway Creek tributary and the presence of the gravel quarries. Reference 38 further states *"all potential surface water pathways are either incomplete or insignificant under current land use scenarios"*. Thus, Reference 38 indicates that runoff from Source 4 is not discharged into Piscataway Creek.

40. **HRS Statement:** Page 65, Para.1: *"Source 5 has multiple PPEs to Piscataway Creek along the entire frontage of Landfills LF-06 and LF-07 (Ref. 32, Figure 2-3, preceeding p. 2-2 and pp. 3-18 and 3-19; Ref. 13)."*
Correction: Citation to Reference 32 is incorrect. Page 2-2, which precedes Figure 2-1, does not contain information on "*multiple potential points of entry*".

41. **HRS Statement:** Page 66, Figure 8. *"Sample Locations in Piscataway Creek"*
Correction: Figure 8 indicates the flow of an unnamed tributary flowing immediately west of probable point of entry (PPE) source 4 (LF05). In addition, the unnamed tributary is shown flowing inside the base boundary before entering Piscataway Creek. Aerial photographs show that the unnamed tributary close to Landfill LF05 is located east of the

landfill approximately 100 feet and is located outside the base boundary. Based on surface contours close to Landfill LF05, any surface water flow that flows inside the base boundary is intermittent, and therefore, not a probable point of entry.

42. **HRS Statement:** Page 66, Figure 8: *"Sample Locations in Piscataway Creek"*.
Correction: The "Most Upstream PPE Source 5" is too far south. Aerial photographs show that the "Most Upstream PPE Source 5" is located north of the oil-water separator at "PPE Source 2." In addition, Figure 8 includes a partial list of the sample locations outside the Piscataway Creek channel. For accuracy and clarity, the HRS should include either all or none of the sample locations on the figure.

HRS Heading: 4.1.2.1.1 Observed Release by Chemical Analysis

43. **HRS Statement:** Page 68, Para. 2: *"However, this sample was not used to document an observed release to surface water because no background samples were collected during this sampling event."*
Correction: This statement is incorrect. The sample at the Piscataway Creek headwall (PC-SD-01), collected during the referenced sampling event, is a background sample.

Chemical Analysis - Sediment

44. **HRS Statement:** Page 69, Para.1: *"However, no background samples were collected during the sampling events. Therefore, the samples collected during this sampling event (PC-1 and PC-2) cannot be used for documenting an observed release to surface water (Ref. 32, pp. 2-1, 2-11 and Table ES-1, following p. ES-2; Ref. 33, pp. 199 through 223; Ref. 13)."*
Correction: This statement incorrectly states that samples PC-1 and PC-2 are invalid because no background samples are available; however, background sediment samples were collected as part of the investigation performed by EA in 1993 (HRS Documentation Record, Ref. 4). In addition, upgradient samples from LF-05 were collected as part of EA's 1995 investigation (HRS Documentation Record, Ref. 32).

Background Concentrations - Sediment

45. **HRS Statement:** Page 69, Para. 2: *"The concentration of lead in these two "background" samples reflect other on-site sources of contamination upstream; however, the concentrations are low enough to document an observed release when compared to the elevated concentrations detected in Piscataway Creek (Ref. 1, p. 51589)."*
Correction: Although it is stated in the EPA document that "Two background samples (5-1 and 5-2) from location 5 were used to establish background sediment concentrations", the EA 1993 document (HRS Documentation Record, Ref. 4) lists the location as a "reference" location. The EPA's citation to Reference 4 is merely to a listing of sediment sample locations during that investigation and that samples from location 5 served as a "reference" location.

46. **HRS Statement:** Page 69, Para. 2: *"The locations where samples 5-1 and 5-2 were collected are shown in Figure 8 as Location 5."*
Correction: EPA selected locations 5-1 and 5-2 as "representative of background for Piscataway Creek". Reference 4 merely includes a list of the locations where sediment

samples were collected during that investigation and that samples from location 5 served as a "reference" location.

47. **HRS Statement:** Page 70, Table 9: *"Background Sediment Locations"*.
Correction: Note that Reference 4 uses the term "reference" for location 5, not "background" as given in the HRS Documentation Record. Reference 4 merely includes a list of where sediment samples were taken during that investigation and that samples from location 5 served as a "reference" location.

48. **HRS Statement:** Page 71, Table 10: *"Background Sediment Sample Concentrations"*.
Correction: Note that Reference 4 uses the term "reference" for location 5, not "background" as given in the EPA document. Reference 4 merely includes a list of locations where sediment samples were taken during that investigation and that samples from location 5 served as a "reference" location.

Contaminated Samples - Sediment

49. **HRS Statement:** Page 72, Para. 3: *"Of all the sediment samples collected from the creek, sample PC-SD-02 contained the highest concentrations of SVOCs (Ref. 32, pp. 2-12 and 4-15)."*
Clarification: This citation is partially inaccurate. Although the SVOC concentration in the samples collected from the creek is discussed on page 4-15 of Reference 32, it is not discussed on page 2-12.

50. **HRS Statement:** Page 74, Table 11: "*Contaminated Sediment Sampling Locations*".
Correction: This table lists the sediment samples collected in April 1993; however, Sample 1-2, which was collected at the same time as Sample 1-1, is not included in this table.

51. **HRS Statement:** Page 75, Table 12: "*Contaminated Sediment Sampling Locations*".
Correction: The Sample Quantitation Limit (SQL) for Sample 1-1 is not 42 ug/kg. There are compounds with reported detections at 42 ug/kg. The SQL cannot be determined from the data summary in the appendix of EA 1993. Table 12 lists incorrect values for several analytes for Sample 1-1; the value for acenaphthene should be 150 ug/kg, acenaphthylene 90 ug/kg, anthracene 440 ug/kg, benzo(a)anthracene 44 ug/kg, and benzo(a)pyrene 56 ug/kg (HRS Documentation Record, Ref. 4, p. E-1).

Attribution

52. **HRS Statement:** Page 81, Para. 1: *"Hazardous substances such as SVOC, and metals have been detected in surface water and sediment at concentrations significantly above background levels (Ref. 4, p. E-1 and E-2: Ref. 32, p. ES-12; Ref. 33, Table I.5-2, p. 206, Table I.6-3, p. 237, Table I.6-4, p. 241, Table I.7-3, p. 253, Table I.7-4, p. 255)."*
Clarification: Hazardous substances have been documented on Andrews Air Force Base. However, the risks associated with the concentrations detected do not warrant an NPL listing. Ref. 4, Ref. 32, and Ref. 38 detail the risk assessments for Source 4 and Source 5. Appendix F and Appendix G of this document summarize and highlight the findings.

53. **<u>HRS Statement:</u>** Page 81, Para. 2: *"Lead is also associated with spent pellets from the skeet range, lead-based paints, used crankcase oil, lead storage batteries, and electroplating (Ref. 20, pp. 11 and 39; Ref. 32, p. 4-4; Ref. 33, Table I.3-3, pp. 145 through 148)."*
<u>Clarification:</u> The skeet range and other sources listed above were not evaluated because data were not available (see HRS Documentation Record, page 8, Table 1). EPA's statement implies that lead contamination was documented for these potential sources, and thus, EPA's statement is misleading.

54. **<u>HRS Statement:</u>** Page 81, Para. 3: *"Lead is one of the metals associated with the Blue Plains Waste Treatment Plant sludge that was placed in Source 4 (Ref. 4, p. 4-52)."*
<u>Correction:</u> The reference could not be found in Reference 4. Because the reference focuses on *"the Blue Plains Waste Treatment Plant"* and cites a page higher than the total number of pages in Section 4 of Reference 4, it may be a reference for another document not included in the HRS Documentation Record.

55. **<u>HRS Statement:</u>** Page 81, Para. 3: *"These PAHs are also produced from combustion and may be associated with the fire training areas, Sources 1 and 2 (Ref. 30, p. 5-1)."*
<u>Correction:</u> This statement is misleading, because it implies that Sources 1 and 2 are contaminated with PAHs. Although soil sampling and SVOC analysis were conducted at Source 1 as part of the 1995-96 PA/SI, no PAH compounds were detected (HRS Documentation Record, Ref. 26, Section 6.3). Thus, PAHs are not associated with Source 1. Additionally, EPA has presented no analytical or recorded use data indicating that PAH contamination is present at Source 2.

56. **<u>HRS Statement:</u>** Page 81, Para. 4: *"The oil-water separator formerly located near Outfall C served a drainage area that included fuel loading and unloading, fuel storage, aircraft fueling and maintenance, and aircraft landing and take-off areas (Ref. 32, pp. 1-20, and 2-12)."*
<u>Correction:</u> It is actually Outfall C that *"served a drainage area that included fuel loading and unloading, fuel storage, aircraft fueling and maintenance, and aircraft landing and take-off areas"*, rather than the oil-water separator. The reference doesn't specify the relationship between the outfall and the oil-water separator. The two may or may not have been connected at one point. This is a critical point because migration of contaminants related to aircraft fuel are exempt from CERCLA regulation (see Appendix D-1), and therefore, should not be included in the EPA's HRS.

57. **<u>HRS Statement:</u>** Page 82, Para. 2: *"In addition, the system includes drainage systems in portions of the east and west operational aprons, the ammunition storage area, and the hazardous waste storage area, and the skeet and trap shooting range southwest of the runways as well as the areas of the active and abandoned underground storage tanks (UST) at two steam plants and at the shops and buildings east of the runways (Ref. 3, Figure 3.3, p. 3-9; Ref. 16, pp. 1-4 and 2-27; Ref. 28)."*
<u>Correction:</u> Areas that were not scored in the HRS Scoring Package are incorrectly mentioned as being contributors, including the skeet and trap range, USTs and two steam plants, and shops and buildings east of the runways (all part of Reference 26, p. AOC-29).

Note that Reference 16 does not mention these facilities and their relation to the base drainage system.

58. **<u>HRS Statement:</u>** Page 83, Para.1: *"Numerous hangars drain to the storm water drainage system as documented below. The hangars use materials containing potentially hazardous substances including: waste fuel, waste oil, hydraulic fluid, wash water (previously contaminated by PD680, a solvent), methylene chloride, dieldrin, solvent, and paint (Ref. 7; Ref. 24; Ref. 26, Section 4.0, p. 13)."*
<u>Correction:</u> The EPA incorrectly cited pages 13, 14, 17, 23 and 36 of Reference 26, which refers to the Car Care, the Auto Hobby Shop, the Davidsonville Dumping Area, and Buildings 1774 – 1777, respectively. These facilities are not in a hangar, nor are they near the hangars.

59. **<u>HRS Statement:</u>** Page 83, Para. 1: *"The following hangars drain to the storm water drainage system: 1, 2, 3, 6, 7, 11, and 16 (Ref. 24; Ref 26, Section 4, pp. 13, 15, 18, 24, and 35)."*
<u>Correction:</u> This citation is incorrect. There is no discussion of the hangars draining to the storm water system in any of these references. The pages referenced from Reference 26 discuss the Car Care Center; the Auto Hobby Shop; a figure of the Auto Hobby Shop; the Davidsonville Dumping Area and a general discussion of AOC-29; and describe Hangar 2 and Buildings 1770, 1771 and 1773, respectively.

HRS Heading: 4.1.2.2.1 Toxicity/Persistence

60. **<u>HRS Statement:</u>** *Page 85, 91, 101, and 103 (Tables 17, 18, 19, and 20, respectively).*
<u>Correction:</u> These tables incorrectly identify Source 1 as containing (or potentially containing) carbon tetrachloride, chlorobromomethane, MEK, naphthalene, toluene, and 1,1,1-TCA. Soil sampling was conducted at Source 1 during the 1995-96 PA/SI and the samples collected were analyzed for volatile and semi-volatile organic compounds. None of the substances specified above were detected in these soil samples.

HRS Heading: 4.1.2.2.2 Hazardous Waste Quantity

61. **<u>HRS Statement:</u>** Page 87: *"According to Table 2-6 of the HRS Final Rule, the HWQ factor value associated with an HWQ value of 23,858.96 is 10,000 (HRS Documentation Record, Ref. 1, p. 51591)."*
<u>Correction:</u> The source HWQ values should be recalculated based on calculations of the cumulative loading rates. Sources 1 and 3 should not be included as sources (see Appendix C). The new values are shown in the revised table below.

<u>Source Number</u>	**Source HWQ** <u>(Section 2.4.2.1.5)</u>
1	Not a source
2	26.94
3	Not a source
4	153.74
5	589.34

Sum of Values: 770.02

According to Table 2-6 of the HRS Final Rule, the HWQ factor value associated with an HWQ value of 770.02 is 100 (HRS Documentation Record, Ref. 1, p. 51591).

62. **HRS Statement:** Page 95, end of page after *"Most Distant Level II Sample"*:
Correction: The fish tissue data were located on pages B-4 and B-5, as opposed to the E-5 and E-6 reference made in the HRS Documentation Record.

63. **HRS Statement:** Page 100, in the *"Average Annual Flow"* column:
Correction: The referenced figure shows that the measured flow in Piscataway Creek was less than 10 cubic feet per second (cfs). The measured flow was not an annual average, but rather discrete measurements taken in the typically dry fall season. The EPA's characterization of the flow in Piscataway Creek is based on an artificially low measurement, and therefore, EPA's estimation of the concentration of any contamination is artificially high because it does not reflect the effect of dilution. Thus, the actual concentration of contaminants in Piscataway Creek is lower than the concentration presented in the HRS. This statement is corrected in our rescore (Appendix B) to reflect that Piscataway Creek annual average flow exceeds 10 cfs (See Appendix H).

HRS Heading: 4.1.4.2.2 Hazardous Waste Quantity

64. **HRS Statement:** Page 105, Para. 1: "*The HWQ values for the six sources at AAFB are listed below.*"
Correction: The statement incorrectly states that six sources were scored; only five sources were scored.

65. **HRS Statement:** Page 105: *"According to Table 2-6 of the HRS Final Rule, the HWQ factor value associated with an HWQ value of 23,858.96 is 10,000 (HRS Documentation Record, Ref. 1, p. 51591)."*
Correction: The source HWQ values should be recalculated based on calculations of the cumulative loading rates. Sources 1 and 3 should not be included as sources (see Appendix C). The new values are shown in the revised table below.

Source Number	**Source HWQ** (Section 2.4.2.1.5)
1	Not a source
2	26.94
3	Not a source
4	153.74
5	589.34

Sum of Values: 770.02

According to Table 2-6 of the HRS Final Rule, the HWQ factor value associated with an HWQ value of 770.02 is 100 (HRS Documentation Record, Ref. 1, p. 51591).

66. **HRS Statement:** Page 107, Para. 1: *"Observed release of copper, lead, and numerous SVOCs to Piscataway Creek have been observed."*
Correction: The EPA cites Reference 4, pp. D-1 and D-2 as the source for this data; however, no observed release of copper is documented on the cited pages of Reference 4.

APPENDIX B

SCORESHEETS

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Groundwater Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	NE[a]	--
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	47.03	2,211.82
2b.	Groundwater to Surface Water Migration Component (from Table 4-25, line 28)	NE	--
2c.	Surface Water Migration Pathway Score (S_{sw}) (Enter the larger of lines 2a and 2b as the pathway score.)	47.03	2,211.82
3	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NE	--
4	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NE	--
5	Total of $S_{gw}{}^2 + S_{sw}{}^2 + S_s{}^2 + S_a{}^2$		2,211.82
6	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	--	**23.51**

Note: [a] NE = Not evaluated

Table 4-1
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

Factor Categories and Factors		Appendix C*	Maximum Value	Value Assigned in HRS Document Record	Value of Re-score
Drinking Water Threat					
	Likelihood of Release				
1.	Observed Release	p. 35	550	550	0
2.	Potential to Release by Overland Flow				
	2a. Containment	p. 35	10	---	10
	2b. Runoff	p. 35	25	---	25
	2c. Distance to Surface Water	p. 35	25	---	25
	2d. Potential to Release by Overland Flow [lines 2a x (2b + 2c)]	p. 35	500	---	500
3.	Potential to Release by Flood				
	3a. Containment (Flood)	p. 35	10	---	10
	3b. Flood Frequency	p. 36	50	---	50
	3c. Potential to Release by Flood [lines 3a x 3b]		500	---	500
4.	Potential to Release [lines 2d + 3c, subject to a maximum of 500]	p. 35	500	---	500
5.	Likelihood of Release [higher of lines 1 and 4]	p. 35	550	550	500
	Waste Characteristics				
6.	Toxicity/Persistence		a	10,000	10,000
7.	Hazardous Waste Quantity	p. 36	a	10,000	100
8.	Waste Characteristics	p. 36	100	100	32
	Targets				
9.	Nearest Intake		50	0	0
10.	Population				
	10a. Level I Concentrations		b	0	0
	10b. Level II Concentrations		b	0	0
	10c. Potential Contamination		b	0	0
	10d. Population [lines 10a + 10b + 10c]		b	0	0
11.	Resources		5	5	5
12.	Targets [lines 9 + 10d + 11]		b	5	5
	Drinking Water Threat Score				
13.	Drinking Water Threat Score [(lines 5 x 8 x 12)/82,500, subject to maximum of 100]		100	3.33	0.97

* Cross-reference for justification for all numbers that change

Table 4-1
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
(Cont.)

Factor Categories and Factors		Appendix C*	Maximum Value	Value Assigned in HRS Document Record	Value of Re-score
Human Food Chain Threat					
	Likelihood of Release				
14.	Likelihood of Release [same value as line 5]	p. 35	550	550	500
	Waste Characteristics				
15.	Toxicity/Persistence/Bioaccumulation		a	5×10^8	5×10^8
16.	Hazardous Waste Quantity	p. 36	a	10,000	100
17.	Waste Characteristics	p. 36	1,000	1,000	320
	Targets				
18.	Food Chain Individual	p. 37	50	45	2
19.	Population				
	19a. Level I Concentrations		b	0	0
	19b. Level II Concentrations	p. 37	b	0.03	0
	19c. Potential Human Food Chain Contamination	p. 37	b	0.003	0.0003
	19d. Population [lines 19a + 19b + 19c]	p. 37	b	0.033	0.0003
20.	Targets [lines 18 + 19d]	p. 37	b	45.033	2.0003
	Human Food Chain Threat Score				
21.	Human Food Chain Threat Score [(lines 14 x 17 x 20)/82,500, subject to maximum of 100]	p. 37	100	100	3.88

* Cross-reference for justification for all numbers that change

Table 4-1
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET
(Concluded)

Factor Categories and Factors		Appendix C*	Maximum Value	Value Assigned in HRS Document Record	Value of Re-score
Environmental Threat					
	Likelihood of Release				
22.	Likelihood of Release [same value as line 5]		550	550	500
	Waste Characteristics				
23.	Ecosystem Toxicity/Persistence/Bioaccumulation		a	5×10^8	5×10^8
24.	Hazardous Waste Quantity	p. 38	a	10,000	100
25.	Waste Characteristics	p. 38	1,000	1,000	320
	Targets				
26.	Sensitive Environments				
	26a. Level I Concentrations	p. 38	b	500	0
	26b. Level II Concentrations		b	50	0
	26c. Potential Contamination	p. 38 & 39	b	68	21.75
	26d. Population [lines 26a + 26b + 26c]	p. 39	b	618	21.75
27.	Targets [value from line 26d]	p. 39	b	618	21.75
	Environmental Threat Score				
28.	[(lines 22 x 25 x 27)/82,500, subject to maximum of 60]	p. 39	60	60	42.18
	Surface Water Overland/Flood Migration Component Score for a Watershed				
29.	Watershed Score[c] [lines 13 + 21 + 28, subject to a maximum of 100]	p. 39	100	100	47.03
SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE					
30.	Component Score (S_{of})[c] [highest score from line 29 for all watersheds evaluated, subject to a maximum of 100]	p. 39	100	100	47.03

[a] Maximum value applies to waste characteristics category.
[b] Maximum value not applicable.
[c] Do not round to nearest integer.
* Cross-reference for justification for all numbers that change

APPENDIX C

HRS RESCORE DOCUMENTATION

APPENDIX C

HRS RESCORE

SECTION A. RATIONALE FOR RESCORING

The following points were the basis for rescoring the package:

1. **POINT:** Hazardous substances, PAHs and lead, are not observed releases to Piscataway Creek as listed in the HRS Documentation Record p. 83.
   JUSTIFICATION: Because PAHs and lead are generated from aircraft emissions and because they are petroleum products, PAHs and lead are exempt from CERCLA as described in Appendix D-1. Therefore, there has been no observed release to Piscataway Creek. The score is recalculated based on the potential to release.

2. **POINT:** The summed source Hazardous Waste Quantity (HWQ) value on pages 87, 93 and 105 of the HRS Documentation Record is not correct.
   JUSTIFICATION: The revised HWQ value is shown in Appendix A, pages 25 and 26. Source 1 is under three feet of concrete and is therefore not a source. Source 2 data collected in 1988 and 1989 by USGS failed quality control checks according to Reference 25 of the HRS Documentation Record. If this data could be used, all contaminants listed in Reference 25 are below the benchmark soil exposure pathway in the 1996 Superfund Chemical Data Matrix, and therefore, Source 2 would not be considered a source of contamination. However, Table 4, on page 28 of the HRS Documentation Record, lists "recorded use" as evidence of contamination in Source 2. Therefore Source 2 will remain a source for calculating the Hazardous Waste Quantity value. Source 3 is not a source based on the metal concentrations and applicable loading rates as outlined in Appendix E. Source 4 will remain a source for calculating the Hazardous Waste Quantity value. Source 5 area has been recalculated to more accurately reflect the contaminated areas. The new area calculations are shown in Appendix A, pages 20 and 21.

3. **POINT:** The flow rate of Piscataway Creek is not 0.95 cubic feet per second (cfs) to 2.23 cfs as listed on page 97 of the HRS Documentation Record.
   JUSTIFICATION: The flow rate was measured and recalculated to be 19.88 cfs approximately 4.5 miles downstream of the headworks of Piscataway Creek. Appendix H shows the calculation and the stream flow data. This changes the dilution weight from 1 to 0.1, and has a direct effect on several of the values in the score.

On the basis of the three statements above, the site score (based on data used by EPA to score AAFB) is revised because of the following:

1. There is no longer an "observed release to surface water", but rather a "potential to release", because concentrations of PCBs and metals remain in the soil at levels above the HRS benchmark levels used for scoring; and
2. There is no longer a sensitive environment subject to Level I or Level II concentrations of contaminants. Piscataway Creek is subject to only a "potential to release" of contaminants other than PAHs and lead.

The revision to the HRS Score is detailed in the sections below.

SECTION B. ORGANIZATION OF RESCORING INFORMATION

The rescoring information presented below follows the section numbering outlined in the HRS Final Rule (HRS Documentation Record, Ref. 1). The corresponding line number in the Surface Water Overland/Flood Migration Component (SWOFMC) Scoresheet is presented within each section (HRS Documentation Record, Table 4-1). A revised SWOFMC Scoresheet summary that includes the rescore values is included at the end of this Appendix.

Note that only those sections (and therefore, SWOFMC Scoresheet values) affected by the points listed above are addressed. Scoresheet values that were determined in the HRS Documentation Record, and which are not affected by the points listed above, are not addressed in this rescoring effort.

SECTION C. RESCORING INFORMATION

4.1.1.3 Evaluation of Overland/Flood Migration Component

DRINKING WATER THREAT

4.0 Observed Release

Because there has been no observed release to surface water (see Section A, Point 1), the value of line 1 in the SWOFMC Scoresheet is assigned a value of 0.

4.1.2.1.2.1.1 Containment

From Table 4-2 of the HRS Final Rule (HRS Documentation Record, Ref. 1, p. 51609), a containment value of 10 is added to 2a, because there is at least one source with a containment value of 10.

4.1.2.1.2.1.2 Runoff

There is insufficient information to evaluate the runoff factor following the HRS Final Rule (HRS Documentation Record, Ref.1, p. 51609). In the absence of data and to be conservative, the maximum value of 25 will be assigned. A value of 25 is added to line 2b of the SWOFMC Scoresheet.

4.1.2.1.2.1.2 Distance to Surface Water

The exact distance to surface water (from each PPE) is unknown; however, to be conservative, the worst case scenario of less than 100 feet was selected. According to Table 4-7 in the HRS Final Rule (HRS Documentation Record, Ref. 1, p. 51611), this corresponds to a value of 25. A value of 25 is added to line 2c of the SWOFMC Scoresheet.

4.1.2.1.2.2.1 Containment

There is no flood containment at Source 5; therefore, a value of 10 is assigned from Table 4-8 of the HRS Final Rule (HRS Documentation Record, Ref. 1, p. 51611). A value of 10 is added to line 3a of the SWOFMC Scoresheet.

4.1.2.1.2.2.2 Flood Frequency
There is insufficient information to evaluate this factor. In the absence of data, and to be conservative, the maximum value of 50 will be assigned. A value of 50 is added to line 3b of the SWOFMC Scoresheet.

4.1.2.2.1 Toxicity/Persistence
Because PCBs have been detected in Source 5, a toxicity/persistence value of 10,000 is assigned (see HRS Documentation Record, pp. 57, 87, 93 and 105 for further details). Thus, a value of 10,000 is added to line 6 of the SWOFMC Scoresheet.

4.1.2.2.2 Hazardous Waste Quantity (HWQ)
The calculation of the corrected HQW value is shown in Appendix A, pages 25 and 26. The revised HWQ of 770.02 (see Section A: Rationale for Re-scoring, Point 2) corresponds to a HWQ Factor Value of 100 (HRS Documentation Record, Ref. 1, p. 51591). A value of 100 is added to line 7 of the SWOFMC Scoresheet.

4.1.2.2.3 Waste Characteristics Factor Category Value
The waste characteristics product is calculated by multiplying the Toxicity/Persistence value (10,000) by the HWQ Value (100) and is equal to 1×10^6. This corresponds to Waste Characteristic Factor Category Value of 32 (HRS Documentation Record, Ref. 1, p. 51592, Table 2-7). A value of 32 is added to line 8 of the SWOFMC Scoresheet.

HUMAN FOOD CHAIN THREAT

4.1.3.1 Human Food Chain Threat –Likelihood of Release
This value is the same as that assigned under the drinking water threat. A value of 500 is added to line 14 of the SWOFMC Scoresheet.

4.1.3.2.1 Toxicity/Persistence/Bioacumulation (T/P/B)
Because PCBs have been detected in Source 5, a T/P/B factor value of 5×10^8 is assigned (see HRS Documentation Record, pp. 57, 87, 93 and 105 for details). A value of 5×10^8 is added to line 15 of the SWOFMC Scoresheet.

4.1.3.2.2 Hazardous Waste Quantity (HWQ)
The HWQ is the same as that calculated for the drinking water threat (see above). A value of 100 is added to line 16 of the SWOFMC Scoresheet.

4.1.3.2.3 Waste Characteristics Factor Category Value
The waste characteristics product is calculated by multiplying the T/P/B value (5×10^8) by the HWQ (100) and is equal to 5×10^{10}. This corresponds to Waste Characteristic Factor Category Value of 320 (HRS Documentation Record, Ref. 1, p. 51592, Table 2-7). A value of 320 is added to line 17 of the SWOFMC Scoresheet.

4.1.3.3.1 Food Chain Individual

The HRS Documentation Record lists PAHs and lead as observed releases; however, these compounds are exempt from regulation under CERCLA (see Section A: Rationale for Re-scoring, Point 1) and cannot be considered as observed releases to surface water. Because concentrations of PCBs and metals remain in the soil at levels above the HRS benchmark levels and a fishery is present within the target distance limit, a value is assigned using the dilution factor from Table 4-13 on page 51613 of the HRS Final Rule. The fishery is observed to begin in the "area of critical state concern" listed in Ref. 34 of the HRS Documentation Record. At that point, Piscataway Creek is a small to moderate stream with a flow between 10 to 100 cfs as documented in Appendix H (see Section A: Rationale for Re-scoring, Point 3). This corresponds to a dilution weight of 0.1 in Table 4-13 on page 51613 of the HRS Final Rule. Because there is no release to surface water, but a fishery is present within the TDL, the dilution weight (0.1) is multiplied by a factor of 20 (HRS Final Rule, p. 51620) to get a value of 2. A value of 2 is added to line 18 of the SWOFMC Scoresheet.

4.1.3.3.2.2 Population – Level II Concentration

There are no fisheries subject to Level II concentrations because PAHs and lead are exempt as outlined in Appendix D-1. Therefore a value of 0 is added to line 19b of the SWOFMC Scoresheet.

4.1.3.3.2.3 Potential Human Food Chain Contamination

Piscataway Creek is in part a fishery; however, the amount of fish collected annually is unknown. Therefore, the lowest annual production range (0 to 100) pounds is assumed, as outlined on page 100 of the HRS Documentation Record. This corresponds to a Human Food Chain Population value (HFCPV) of 0.03 (HRS Documentation Record, Ref. 1, p. 51621, Table 4-18). The potential for human food chain contamination factor is determined by multiplying the HFCPV by the dilution weight of the water body in which the fishery is located (i.e., Piscataway Creek) which has a dilution factor of 0.1 (see Section 4.1.3.3.1 above) and then divide the product by 10. The HFCPV (0.03) multiplied by the dilution factor (0.1) divided by 10 results in a value of 0.0003. A value of 0.0003 is added to line 19c of the SWOFMC Scoresheet.

4.1.3.3.2.4 Calculation of Population Factor Value

Line 19c (0.0003) is the only remaining value, so lines 19a + 19b + 19c = 0.0003. A value of 0.0003 is added to line 19d of the SWOFMC Scoresheet.

4.1.3.3.3 Calculation of Human Food Chain Threat-Targets Factor Category Value

Lines 18 (2) + 19d (0.0003) = 2.0003. A value of 2.0003 is added to line 20 of the SWOFMC Scoresheet.

4.1.3.4 Calculation of Human Food Chain Threat Score for a Watershed

Line 14 (500) x line 17 (320) x line 20 (2.0003) = 320,480/82,500 = 3.88. A value of 3.88 is added to line 21 of the SWOFMC Scoresheet.

ENVIRONMENTAL THREAT

4.1.4.1 Environmental Threat –Likelihood of Release

This value is the same as that assigned under the drinking water threat shown on page 30 number 5. A value of 500 is added to line 22 of the SWOFMC Scoresheet.

4.1.4.2.1.1 Ecosystem Toxicity/Persistence/Bioacumulation (T/P/B)

Because PCBs have been detected in Source 5, an ecosystem T/P/B factor value of $5x10^8$ is assigned (see HRS Documentation Record, pp. 57, 87, 93, and 105 for details). A value of $5x10^8$ is added to line 23 of the SWOFMC Scoresheet.

4.1.4.2.2 Hazardous Waste Quantity (HWQ)

The HWQ is the same as that calculated for the drinking water threat (see above). A value of 100 is added to line 24 of the SWOFMC Scoresheet.

4.1.4.2.3 Waste Characteristics Factor Category Value

The waste characteristics product is calculated by multiplying the Ecosystem T/P/B value ($5x10^8$) by the HWQ (100) and is equal to 5×10^{10}. This corresponds to Waste Characteristic Factor Category Value of 320 (HRS Documentation Record, Ref. 1, p. 51592, Table 2-7). A value of 320 is added to line 25 of the SWOFMC Scoresheet.

4.1.4.3.1 Sensitive Environments

Because there are no sensitive environments subject to Level I or Level II concentrations (see Section A: Rationale for Re-scoring, Point 1), only a potential to contaminate those sensitive environments within the TDL exists. Lines 26a and 26b in the SWOFMC Scoresheet are assigned values of 0.

4.1.4.3.1.3 Potential Contamination

As documented on page 110 of the HRS Documentation Record, two sensitive environments and greater than 20 miles of wetlands are subject to potential contamination. The dilution weight is the only change on this page. The flow in Piscataway Creek approximately 4.5 miles downstream from the headworks, is between 10 and 100 cfs as documented in Appendix H (see Section A: Rationale for Re-scoring, Point 3). According to Table 4-13 on page 51613 of the HRS Final Rule, this flow corresponds to a dilution weight of 0.1.

The flow in Piscataway creek is less than 10 cfs up to a certain point. The exact point where the flow changes cannot be precisely determined; however, flow above 10 cfs definitely occurs before the creek enters the “area of critical state concern”. To be conservative, the flow was calculated just before Piscataway Creek reaches the “area of critical state concern”, which is approximately 4.5 miles downstream of the headworks. Up to that point, Piscataway Creek is assumed to have an associated flow below 10 cfs, which corresponds to a dilution factor of 1. There is approximately four to eight miles of wetland in this distance of Piscataway Creek, which corresponds to a wetland frontage value of 150 according to Table 4-24 on page 51625 of the HRS Final Rule. According to page 239 of the HRS Guidance Manual (EPA 1992), when a wetland is in multiple water body categories, it can be divided and evaluated using dilution weights applicable to each water body category. In this instance, there are two water body categories; upstream and downstream of the beginning of the "area of critical state concern".

According to Ref. 31 page 10, anadromous fish species ascend in the lower Piscataway Creek. The flow rate in the lower portions of Piscataway Creek would also be above 10 cfs and therefore have a dilution weight of 0.1.

Based on this information, the Potential Contamination Factor (PCF) for each type of surface water body is shown below;

TABLE C-1: POTENTIAL CONTAMINATION FACTORS FOR SUFACE WATER BODIES

Type of Surface Water Body	**Sum of Sensitive Environment Values (Sj)** (HRS Doc. Record p. 110)	**Wetland Frontage Value (Wj)** (HRS Doc. Record p. 110)	**Dilution Weight (Dj)** (see Section A: Rationale for Re-scoring, Point 3)	**Potential Contamination Factor (PCF) Dj(Wj + Sj)**
Minimal stream (Piscataway Creek up to ~ 4.5 miles)	0	150	1	150
Small to moderate stream (Piscataway Creek)	175	500	0.1	67.5

Thus, the sum of PCFs for the sensitive environments is 217.5. Based on this number, the Potential Contamination Factor Value (PCF/10) is calculated to be 21.75. A value of 21.75 is added to line 26c of the SWOFMC Scoresheet. As a result, lines 26d and 27 also become 21.75 (see Appendix B Scoresheets).

Calculation of Surface Water Migration Pathway Score

The Surface Water Migration Pathway score is the sum of the drinking water, human food chain threat, and environmental threat scores. These scores are calculated on lines 13, 21 and 28 of the SWOFMC Scoresheet and correspond to 0.97, 3.88, and 42.18 respectively. Thus, the sum of these scores is 47.03.

D. SUMMARY OF SCORES

Drinking Water Threat Score:	0.97
Human Food Chain Threat Score:	3.88
Environmental Threat Score:	42.18
Total:	47.03

The square root of $47.03^2/4$ is 23.51

HRS SITE SCORE: 23.51

APPENDIX D: POLYNUCLEAR AROMATIC HYDROCARBONS AND LEAD

APPENDIX D-1

CERCLA PETROLEUM EXCLUSION DISCUSSION

Background

Piscataway Creek's headwaters are on AAFB property. The EPA Hazard Ranking System (HRS) Documentation Record has shown that polynuclear aromatic hydrocarbons (PAHs) and lead were observed in Piscataway Creek up to 1.2 miles downstream from the headwaters. Based on data provided in subsequent sections of our comments (Appendices D-2 and D-3), it is the PAH and lead on the runways, taxiways, and aprons and in the topsoil adjacent to the runways, taxiways, and aprons that are conveyed in runoff. The contaminants are transported to the creek through the storm sewers or directly through surface runoff and deposited into the creek.

Summary

The contamination resulting from PAH and lead deposition from combustion of fuel from various jet and piston engines does not provide a basis for CERCLA liability. Storm water runoff containing lead and PAHs derived from jet fuel combustion is not a "hazardous substance" under CERCLA because the jet fuel falls within the petroleum exclusion and because emissions from aircraft are excluded explicitly from the definition of a "release". Because the jet fuel is not a "hazardous substance", neither its combustion by-products nor its migration via storm water runoff, are "hazardous substances" under CERCLA.

Analysis

The CERCLA Petroleum Exclusion

> CERCLA categorically excludes "petroleum" from the definition of "hazardous substances". CERCLA § 101(14). "Petroleum" includes any raw or refined petroleum product, even if the product includes naturally occurring hazardous constituents or hazardous constituents added during refining. The EPA defines "petroleum" to include hazardous substances that normally would be found in refined petroleum fractions, but excludes hazardous substances that exceed normal levels or that would not normally be found in petroleum fractions (EPA, Scope of the Petroleum Exclusion, July 31, 1987). Any constituents, such as lead, that are added to a petroleum product through the refining process are covered by the petroleum exclusion. Thus, "petroleum" includes both indigenous (to crude oil) and refinery-added "hazardous constituents".

Virtually all petroleum products contain hazardous constituents that are naturally occurring or added during refining. To exclude all hazardous constituents contained in petroleum products from the CERCLA petroleum exclusion would be contrary to the legislative intent to exclude petroleum products from CERCLA liability. EPA's policy is to interpret the petroleum exclusion broadly. EPA's interpretation of petroleum under CERCLA includes any crude oil fractions that are indigenous to the crude oil, even if the fraction is itself a "hazardous substance" (benzene, for example**).** Recent case law upholds EPA's definition of "petroleum". In *Foster v. United States*, the United States argued that total petroleum hydrocarbons (TPHs) and PAHs found at a site contaminated by the operation of an adjoining arsenal at Fort McNair were not "hazardous substances" under CERCLA because they fell within the definition of "petroleum" and were thus excluded by the petroleum exclusion, 922 F. Supp. 642 (D.D.C. 1996). The District Court for the District of Columbia upheld these arguments and held that TPHs and PAHs present at the site did not give rise to CERCLA liability because the contamination occurred as the result of the federal government spraying kerosene (a petroleum product) in a canal on the site. Because the source of the TPHs and PAHs was the kerosene, the TPHs and PAHs were excluded from the definition of a hazardous substance under the petroleum exclusion. In its discussion on a different issue, the District Court confirmed the rationale behind the petroleum exclusion. The court held, in *Nixon-Elle Equipment Co. v. John A. Alexander Co*., 949 F. Supp. 1435 (C.D. CA 1996), "...Courts have interpreted the exclusion to preclude liability for otherwise hazardous substances which are contained in and are indigenous to petroleum or are added as a constituent during the refining process. For example, even though lead is generally a hazardous substance under §9601(14), if the source of the lead on a property is petroleum and that lead is the lead which was indigenous to the petroleum or lead added to the petroleum when it was refined into gasoline, that lead is not a "hazardous substance" for purposes of CERCLA liability. Citing *Wilshire Westwood Assoc. v. Atlantic Richfield*, 881 F.2d 801, 805 (9th Cir. 1989)."

Conversations with the CERCLA/RCRA hotline staff (September 8, 1998) reinforced the interpretation that, while not affecting the applicability of any other laws, the fact that the contamination results from deposition at or around an airport flightline does not bring the contamination within the scope of CERCLA response liability. Further, the fact that the deposition is transported through storm water does not trigger CERCLA liability. In both instances, if the combustion of jet fuel that created the deposition falls within the petroleum exclusion, then it is not a hazardous substance under CERCLA. Therefore, if a contaminant is not a hazardous substance as discussed above, the contaminant cannot provide the basis for a hazard ranking score that would allow EPA to list the site on the NPL.

Release of a Hazardous Substance

Liability under CERCLA requires a "release" into the environment of a "hazardous substance". Each of these terms has a specific meaning within a regulatory context. As discussed above, the definition of "hazardous substance" excludes petroleum. In addition, CERCLA expressly defines a "release" as "any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment . . . but excludes . . . (b) emissions from engine exhaust of a motor vehicle, rolling stock, *aircraft*, vessel, or pipeline pumping station engine . . ." [CERCLA § 101(22) (emphasis added)]. Because no "release" of a "hazardous substance" has occurred, CERCLA liability does not arise. Therefore, PAH and lead that are emitted from jet and piston powered aircraft at AAFB, are not releases to the environment per CERCLA § 101(22). On this basis, AAFB cannot be placed on the NPL due to observations of these emissions in the environment.

APPENDIX D-2
GENERATION OF PAH COMPOUNDS AND LEAD

Background

Aircraft engine combustion results in emissions containing a variety of organic and inorganic compounds. Numerous aircraft emissions studies have sought to identify which compounds are found in the emissions of aircraft engines. These studies have also attempted to quantify the various compounds in aircraft emissions.

Emission Characterization

Relative to the production of organic and inorganic compounds during the combustion process the following have been observed:

- Combustion byproducts in aircraft engine emissions contain a variety of compounds of possible environmental concern including xylenes, toluene, other aromatics, and polynuclear aromatic hydrocarbons (PAHs) (Ref. A, B, C - listed at the end of this Appendix).
- PAHs typically make up about 1% of the total organic emissions from aircraft engines (Ref. A); PAH concentrations generally follow the emission trend for total organics (i.e., as organic emissions increase under a given condition, PAH concentrations also increase at a level of about 1% of total organics) (Ref. B).
- One study (Ref. A) cites fuel type as a causative factor for differences in emissions from engines, not necessarily engine design. However other studies note significant differences in organic emissions from different engines using apparently the same fuel (Ref. B, C).
- All sources cite engine power levels (i.e., idle, 30% thrust, etc.) as significantly influencing production of organic compounds (Ref. A, B, C).
- The emissions of PAHs are generally an order of magnitude higher at engine idle than at 30% thrust (Ref. A, B, C), the emissions decrease exponentially as engine thrust increases. One study cites organic content approaches background when the thrust equals about 75% (Ref. B).
- Some studies attempted to quantify the organic compounds associated with emission particulate matter vs. the vapor phase and found the majority (>97%) of the organics (PAHs included) were found in the vapor phase (Ref. B, C).
- Naphthalene and its derivatives dominated the PAH distribution (considering all phases together) accounting for more than 95% of the PAH content in all cases (Ref. A, B, C).
- The smaller molecular weight PAHs, essentially < than 4 rings including naphthalene and their derivatives, were found almost exclusively in the vapor phase which eventually precipitate to the land and water; the larger compounds essentially > than 4 rings including benzo (a) pyrene were more often associated with the particulate phase (Ref. C).
- Metals' concentrations are provided but are not discussed at length (Ref. B, C).
- Lead content in aircraft emissions appears in two references but is not discussed in the text at all (Ref. B, C).

The table below shows a cross-section of the data presented in the various reports (all data shown at idle engine conditions).

Table D-1.
Organic and Inorganic Emission Components at Engine Idle (ug/m^3)

Engine Type	PAHs	Naphthalene	Benzo [a] pyrene	Lead
Reference A				
TF 39	1979.5	870	0.056	N/R[1]
CFM 56	1500.2	620	0.111	N/R
Reference B				
J-79	1051.7	988	0.01	0.13
TF 33-3	2590.6	2530	0.24	0.01
TF 33-7	3648.4	3350	0.31	0.01
Reference C[2]				
F 110	6.7	1.2	0.00061	0.015[3]
F 101	2.6	0.7	0.00019	0.05

[1]Not reported.
[2]Benzo(a)pyrene in Reference C was identified as associated with the particulate phase, other references did not differentiate relative to phase.
[3]Lead reported in filter blank at 0.015 ug/m^3.

Analysis of wipe samples of the runways collected by AAFB in August 1998 and surface soil samples (see Appendix I for sample locations and Appendix J for sample results) verifies PAH and lead deposition on and nearby the runways, taxiways, and aprons at the Base.

Concentrations of PAH and Lead in Urban Soils

Studies have shown that levels of PAH and lead can be high in soils surrounding cities and roadways (Ref. D and E - listed at the end of this Appendix). These studies have shown levels of PAH and lead are significantly higher in urban areas and around busy roadways than in rural or suburban areas. Data that support this conclusion are provided below.

New England Study (Reference E)

Sixty samples of surface soils from urban locations in three New England cities were analyzed for PAH compounds. In addition, all samples were analyzed for total petroleum hydrocarbons (TPH) and seven metals. The upper 95% confidence interval was 3 mg/kg for benzo(a)pyrene (BaP) toxic equivalents, 12 mg/kg for total potentially carcinogenic PAH, and 25 mg/kg for total PAH. The upper 95% confidence interval for lead was 737 mg/kg in Boston, 463 mg/kg in Providence, and 378 mg/kg in Springfield.

The concentration of PAH for all of the areas sampled are summarized in the following table:

Table D-2.
Summary Statistics for PAH -- All Areas Combined (mg/kg)

Compound	Min. detect	Max. detect	Arithmetic Mean	Upper 95% interval	Frequency of detects out of 62
2-Methylnaphthalene	0.017	0.64	0.151	0.173	19
Acenaphthene	0.024	0.34	0.201	0.306	30
Acenaphthylene	0.018	1.10	0.173	0.208	24
Anthracene	0.029	5.70	0.351	0.535	54
Benzo*(a)*anthracene	0.048	15.00	1.319	1.858	58
Benzo*(a)*pyrene (BaP)	0.040	13.00	1.323	1.816	57
Benzo*(b)*fluoranthene	0.049	12.00	1.435	1.973	55
Benzo*(g,h,I,)*perylene	0.200	5.90	0.891	1.195	36
Benzo*(k)*fluoranthene	0.043	25.00	1.681	2.522	59
Chrysene	0.038	21.00	1.841	2.693	60
Dibenzo*(a,h)*anthracene	0.020	2.90	0.3888	0.521	32
Flouranthene	0.110	39.00	3.047	4.444	60
Flourene	0.022	3.30	0.214	0.317	35
Indeno(*1,2,3-c,d*)pyrene	0.093	6.00	0.987	1.293	43
Naphthalene	0.018	0.66	0.125	0.149	35
Phenanthrene	0.071	36.00	1.838	2.982	61
Pyrene	0.082	11.00	2.398	2.945	61
Total BaP-Toxic Equiv.	0.257	21.31	2.437	3.324	62
Total carcinogenic PAH	0.680	77.70	8.973	12.423	62
Total PAH	2.292	166.65	18.361	24.819	62

Table D-3.
Summary Statistics for Metals and TPH in Soils by City (mg/kg)

Compounds	Boston (n=20)		Providence (n=20)		Springfield (n=20)	
	Arith. mean	Upper 95% interval	Arith. mean	Upper 95% interval	Arith. mean	Upper 95% interval
Arsenic, total	4.20	5.59	3.53	4.27	5.63	9.23
Barium, total	53.95	66.25	45.29	59.43	45.17	51.03
Cadmium, total	1.55	2.79	ND	ND	ND	ND
Chromium, total	23.00	27.69	12.08	14.35	12.62	14.45
Lead, total	398.70	737.44	305.76	462.98	261.69	377.76
Mercury, total	0.29	0.39	0.19	0.24	0.20	0.25
Selenium, total	0.51	0.57	0.39	0.48	0.53	0.55
TPH	474.90	652.62	267.43	338.19	184.38	233.27

Using BaP as a representative PAH, the upper 95% confidence interval of 1.81 mg/kg of BaP in soils for three New England cities exceed the highest concentration of BaP in Piscataway Creek by three fold (1.81 mg/kg vs. 0.663 mg/kg). These studies in three urban areas represent residential land use concentration of PAH, much higher than the concentration in Piscataway Creek.

Lead concentrations, shown in Table D-3 above, in the three cities are very comparable to the highest concentration found in all the three landfills at AAFB (the Boston 95% confidence interval (737.44 mg/kg) actually exceeds the highest AAFB lead concentration (661 mg/kg). These data for PAH and lead demonstrate that the concentrations at AAFB are similar to those of urban areas in New England, and are acceptable for residential land use.

References

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B. Kuhlman, M.R., and Chuang, J.C., "Characterization of Chemicals on Engine Exhaust Particles". Final Report No. ESL-TR-88-50. Tyndall AFB, Florida. June, 1989.

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D. Bradley, L.J.N.; Magee, Allen, S.L., "Background Levels of Polycyclic Aromatic Hydrocarbons (PAH) and Selected Metals in New England Urban Soils", Journal of Soil Contamination, 3(4): (1994).

E. J.D. Butler, Valery Butterworth, Sarah C. Kellow, Heather G. Robinson, Some Observations on the Polycyclic Aromatic Hydrocarbon (PAH) Content of Surface Soils in Urban Areas, The Science of the Total Environment, 33 (1984) 75-85.

APPENDIX D-3

STATISTICAL ANALYSIS OF PAH AND LEAD

Samples of topsoil in the flightline at AAFB, wipe samples of the runway, and samples of sediments in Piscataway Creek were collected in August 1998 and analyzed for PAH and lead. The objectives of this exercise were to determine if PAH and lead were much higher near the runway, and therefore a result of aircraft engine emissions, and whether soil and runway contamination could be the source of contaminants in Piscataway Creek via runoff during wet weather events.

The conclusions, based on statistical analyses alone, are given below.

- The statistics for AAFB support numerous other studies (Appendix D-2) that show surface soils in urban industrial areas contain PAHs and lead from combustion of fuel from automobile engines and industrial exhausts, and in the case of AAFB, from aircraft engines. This includes emissions of lead from piston powered aircraft.
- Runways are more probable contributors of PAH and lead to Piscataway Creek than the potential sources identified in the HRS Documentation as supported by the concentrations of PAH and lead found in runway wipe samples. Particles of lead and PAH on the runway (see Appendix I figure for runway sample locations and values) are easily mobilized during rain events and conveyed through a preferential pathway (storm sewer) to Piscataway Creek. Also, surface soils in the flightline near the runways contain statistically higher (greater than 95% probability) concentrations of BaP (average of 3,138 ug/kg), a representative PAH, compared to any of the five potential sources at AAFB. This eliminates the potential that any of the five sources are significant contributors of lead and PAH to Piscataway Creek.

<u>Comparison of PAH in Surface Soils to PAH in Subsurface Soils</u>

Table D-4 compares the average concentrations and the analysis of variance of benzo(a)pyrene (BaP), a representative PAH, in surface soils versus subsurface soils. The surface soil average BaP concentration (3,138 ug/kg) found near the runways (see Appendix I figure for sample locations) is approximately five times higher than the average BaP concentration (648 ug/kg) in subsurface soils. The analysis of variance demonstrates that the average BaP concentration in the surface soils is statistically significantly higher (greater than 95% probability) than the BaP in subsurface soils. Because there is no generation of BaP wastes at AAFB and because the surface soils contain statistically higher concentrations of BaP compared to subsurface soils, it can be concluded that the additional PAH in surface soils are from aircraft emissions and atmospheric deposition of PAH (BaP in this example) to the surface soils.

Table D-4.

Analysis of Variance

Comparison of Surface Soil Samples to Subsurface Soil Samples

Concentration of Benzo(a)pyrene[1] (ug/kg)

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Subsurface Soil Samples*	7	4539	648.4285714	362263.9524
Surface Soil Samples**	9	28243	3138.111111	6323419.611

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	24406669.15	1	24406669.15	6.476256188	0.023349443	4.600110515
Within Groups	52760940.6	14	3768638.615			
Total	77167609.75	15				

1 - Benzo(a)pyrene is used as a representative PAH

* Subsurface soil samples analyzed 10/94 (Ref. 32, HRS Documentation Record)

** Surface soil samples analyzed 8/98 (Appendix I Figure)

Footnote:

Subsurface samples that contained levels of benzo(a)pyrene that were not detectable were not used in the analysis. Using the minimum detection limit would have provided lower subsurface average concentrations, thereby making the subsurface concentrations even more insignificant. All surface samples contained detectable amounts of benzo(a)pyrene, so all surface samples were used for this calculation.

Comparison of Lead in Surface Soils to Lead in Subsurface Soils

Table D-5 compares the average concentrations and the analysis of variance of lead in surface soils vs. subsurface soils. The surface soil average lead concentration (207 mg/kg) found near the runways (see Appendix I for sample locations) is approximately 19 times higher than the average lead concentration (11mg/kg) in subsurface soils. The analysis of variance demonstrates that the average lead concentration in the surface soils is statistically significantly higher (probability greater than 95%) than the lead in subsurface soils. There is no generation of lead wastes at AAFB runways. Thus, it is concluded that the additional lead in surface soils resulted from aircraft emissions and atmospheric deposition of lead to the surface soils.

The above conclusions are supported by data from publications (Appendix D-2) that document PAH and lead found in soils next to urban highways, generated as a result of emissions from combustion engines and industrial burners.

Analysis of Runway Wipe Samples

Runway samples were collected using wipe sample techniques. The following results were reported.

Total PAH (wipe samples per three square inch wipe area):
137.4 ug, 344.5 ug, 56.25 ug, 116.8 ug, and 39.75 ug, for an average of 139 ug.

Lead (wipe samples per three square inch wipe area):
3.46 ug, 4.04 ug, 4.71 ug, 6.23 ug, and 2.45 ug for an average of 4.2 ug.

These masses of PAH and lead deposition on the runway are exposed to wet weather and transportable through surface water runoff to Piscataway Creek. The runway provides the most mobile source of PAH and lead contamination than any other potential source evaluated by EPA in the HRS Documentation Record for AAFB. As stated in Appendix D-1, these constituents are not defined as hazardous substances under CERCLA and are specifically exempt from CERCLA regulation. It is inappropriate to use these constituents for HRS scoring purposes.

Comparison of PAH in Surface Soils to PAH in Piscataway Creek

Table D-6 compares the average concentrations and the analysis of variance of BaP, a representative PAH in surface soils vs. Piscataway Creek sediment. The surface soil average BaP concentration (3,138 ug/kg) found near the runways (see Appendix I for sample locations) is 17 times higher than the BaP concentration (183 ug/kg) in Piscataway Creek sediment. By comparison (Table D-4), the subsurface soil average BaP concentration (648 ug/kg) is only 3.5 times higher than the average sediment BaP concentration (183 ug/kg) in Piscataway Creek. It is not probable that PAH reached Piscataway Creek from landfill sources. It is more probable that PAH was conveyed to the creek from surface soil particles washed to the creek or from aircraft deposition of PAH.

Table D-5.

Analysis of Variance

Comparison of Surface Soil Samples to Subsurface Soil Samples

Concentration of Lead (mg/kg)

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Subsurface Soil Samples*	7	78.96	11.28	24.1453
Surface Soil Samples*	9	1863	207.0111111	51160.78611

ANOVA

Source of Variation	*SS*	*Df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	150848.2547	1	150848.2547	5.15807239	0.039447796	4.600110515
Within Groups	409431.1607	14	29245.08291			
Total	560279.4154	15				

* Soil and sediment samples collected 8/98 (Appendix I Figure)

Table D-6.

Analysis of Variance

Comparison of Surface Soil to Piscataway Creek Sediment

Concentration of Benzo(a)pyrene[1] (ug/kg)

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Surface Soil*	9	28243	3138.111111	6323419.611
Creek Sediment*	8	1466	183.1875	79420.13839

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	36980782.08	1	36980782.08	10.8462253	0.004925501	4.543068144
Within Groups	51143297.86	15	3409553.191			
Total	88124079.94	16				

1 - Benzo(a)pyrene is used as a representative of PAH components

* Soil and sedimant samples analyzed 8/98

Footnote:

For samples containing less than the minimum detection limit, 50% of the minimum detection limit was used.

APPENDIX E

SOURCE 3 MUNICPAL SEWAGE SLUDGE APPLICATION

APPENDIX E

HRS STATEMENT

The HRS Documentation Record, p. 36 states.... *"According to analytical results for Blue Plains Waste Treatment Plant sludge generated from 1982 to 1984, zinc, lead, chromium, copper, and cadmium were present in the sludge at concentrations slightly above those typically found in native soils (Ref. 3, p. 4-52). No other sludge samples were collected during disposal operations or recent site investigations."*

Comment

As shown below, Source 3 can be eliminated as a source of contamination. Because no sample data exist for this source, samples were collected during the August 1998 sampling event at locations shown on the figure in Appendix I. These locations, sample numbers 70, 71, 73, 74, 75, and 76, were chosen because sludge was deposited in these areas. The sample results are representative of the sludge in Source 3. The Appendix I figure corrects the location of Source 3 shown on page 37 of the HRS Documentation Record. Sludge was applied in six-inch lifts with 24 inches of soil placed on top (HRS Documentation Record, Ref. 3, p. 4-49). The surface soil was not used as a representative sample because the surface soils are impacted by airplane exhaust or other anthropogenic sources. The samples were taken at a depth of approximately 3 feet to 3.5 feet to ensure that samples were collected from the previously applied sewage sludge.

The sludge application regulations, found in 40 CFR 503.13, Subpart B, are included at the end of this Appendix. Using an average concentration from the 3 to 3.5 foot samples, the cumulative loading rates were calculated for the heavy metals listed in Table 6, page 39 of the HRS Documentation Record. The following data were used in the calculations.

- Area: 6,080,000 ft^2 (HRS Documentation Record, p. 42) + 5,040,000 ft^2 (approximate additional sludge application area) for a total of $1.112X10^7 ft^2$.
- Depth of sludge: A depth of three feet was used for this calculation in determining the volume of the sludge. A depth of three feet was reasonably assumed because it is unclear how many six-inch lifts were applied.
- Density of sludge: 130 lbs/ft^3 was used as a conservative density of the soils and sludge that are compacted. The actual density of the sludge that has been disked in the soil is likely closer to 100 lbs/ft^3. To be conservative, 130 lbs/ft^3 were used as the sludge density. The density was taken from the Standard Handbook for Civil Engineers, p. 7-53, Table 7-12 (1976). Compact, fine-silty sand or sandy-silt has a density of 130 lbs/ft^3. The highest weight listed is for coarse-sand or sand and gravel (140 lbs/ft^3).
- Non-detect (ND) samples: Cadmium was not detected in two of the samples. To be conservative, the method detection limit (MDL) was used in the calculation to determine the average concentration in the soil.

The cumulative pollutant loading rates and regulatory limits are in Table E-1. The Source 3 metals are listed in Table 6, on page 39 of the HRS Documentation Record. The loading rates calculated for Source 3 metals are below regulatory limits established by EPA in 40 CFR 503.13, Subpart B, for use of sewage sludge as a fertilizer. The average concentrations also are below benchmark concentrations listed in Ref. 2 of the HRS Documentation Record, the Superfund Chemical Data Matrix (SCDM), as shown in Table E-2. Risk based concentrations (RBCs) are listed in Table E-2 if benchmark concentrations are unavailable. Therefore, because the metals are within EPA regulatory limits, Source 3 can be eliminated as a source of contamination.

Table E-1.
Source 3 Loading Rate Comparison

Hazardous Substance	Calculated Loading Rate (kg/hectare)	Regulatory Limit (kg/hectare)
Cadmium	2.28	39
Chromium (total)	227.91	Not listed
Copper	118.81	1,500
Lead	203.53	300
Zinc	390.31	2,800

Table E-2.
Average Sample Concentrations Compared to Benchmark Concentrations

Hazardous Substance	Average Concentration (mg/kg)	Benchmark Concentration (mg/kg)
Cadmium	0.12	39
Chromium (total)	11.97	390
Copper	6.24	Not listed (*RBC = 3,100)
Lead	10.69	Not listed (*Recommended RBC = 400)
Zinc	20.50	23,000

* EPA Region III Residential Risk Based Concentrations

Source 3 - Cumulative Pollutant Loading Rate Calculations

Sludge application area:

$$
\begin{array}{lll}
 & 6{,}080{,}000\ ft^2 & \text{as listed in the HRS Documentation Record} \\
 & \underline{+\ 5{,}040{,}000\ ft^2} & \text{conservatively estimated additional sludge application areas} \\
\text{Total} & 11{,}120{,}000\ ft^2 & = 1.112 \times 10^7\ ft^2
\end{array}
$$

Sludge application volume:

$1.112 \times 10^7\ ft^2 \times 3$ ft deep $= 3.336 \times 10^7\ ft^3$

Weight of sludge and soil:

$$3.336 \times 10^7\ ft^3 \times \frac{130\ lbs^*}{ft^3} \times \frac{1\ kg}{2.2046\ lbs} = 1.967 \times 10^9 \text{ kg soil and sludge}$$

Cumulative Pollutant Loading Rate:

$$1967 \times 10^9 \text{ kg soil} \times \frac{0.12 \text{ mg Cadmium}}{\text{kg soil}} \times \frac{1\ kg}{1 \times 10^6\ mg} = 236.04 \text{ kg Cadmium}$$

$$\frac{236.04 \text{ kg Cadmium}}{1.112 \times 10^7\ ft^2} \times \frac{43{,}560\ ft^2}{1 \text{ acre}} \times \frac{2.471 \text{ acres}}{\text{hectare}} \boxed{= \frac{2.28 \text{ kg Cadmium}}{\text{hectare}}}$$

Average concentrations in the 3’ to 3.5’ samples and associated loading rates.

$$
\left.
\begin{array}{llll}
\text{Chromium} & = 11.97 & \text{mg/kg} & \Rightarrow 227.91 \\
\text{Copper} & = 6.24 & \text{mg/kg} & \Rightarrow 118.81 \\
\text{Lead} & = 10.69 & \text{mg/kg} & \Rightarrow 203.53 \\
\text{Zinc} & = 20.50 & \text{mg/kg} & \Rightarrow 390.31 \\
\text{Cadmium} & = 0.12 & \text{mg/kg} & \Rightarrow 2.28
\end{array}
\right\} \frac{\text{kg}}{\text{hectare}}
$$

* Unit weight of fine silty sand or sandy silt. Taken from Table 7-12, pg. 7-53, Standard Handbook for Civil Engineers 2nd Edition, 1976. Editor: Frecerick S. Merritt

Summary of sample locations and concentrations:

Samples 70, 71, 73, 74, 75, and 76 were taken at the 3’ - 3.5’ interval within sludge application areas. Data listed in mg/kg.

Sample	Cadmium	Chromium	Copper	Lead	Zinc	(all in mg/kg)
70*	MDL (0.07) - ND	20.1	8.19	14.7	33.5	
71*	MDL (0.07) - ND	13.6	6.75	13.9	34.9	
73	0.17	8.5	3.23	9.19	6.99	
74	0.152	3.09	2.2	3.99	2.1	
75	0.13	20	12.5	16.5	22.1	
76	0.141	6.55	4.54	5.88	13.4	
Total:	0.733	71.84	37.41	64.16	22.99	
Average:	0.12	11.97	6.24	10.69	20.50	

* These samples were non-detect (ND) for cadmium. To be conservative the method detection limit (MDL) was added to calculate the average.

sludge to a person who applies the bulk sewage sludge to the land, the person who prepares the bulk sewage sludge shall provide the person who applies the sewage sludge notice and necessary information to comply with the requirements in this subpart.

(g) When a person who prepares sewage sludge provides the sewage sludge to another person who prepares the sewage sludge, the person who provides the sewage sludge shall provide the person who receives the sewage sludge notice and necessary information to comply with the requirements in this subpart.

(h) The person who applies bulk sewage sludge to the land shall provide the owner or lease holder of the land on which the bulk sewage sludge is applied notice and necessary information to comply with the requirements in this subpart.

(i) Any person who prepares bulk sewage sludge that is applied to land in a State other than the State in which the bulk sewage sludge is prepared shall provide written notice, prior to the initial application of bulk sewage sludge to the land application site by the applier, to the permitting authority for the State in which the bulk sewage sludge is proposed to be applied. The notice shall include:

(1) The location, by either street address or latitude and longitude, of each land application site.

(2) The approximate time period bulk sewage sludge will be applied to the site.

(3) The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who prepares the bulk sewage sludge.

(4) The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who will apply the bulk sewage sludge.

(j) Any person who applies bulk sewage sludge subject to the cumulative pollutant loading rates in §503.13(b)(2) to the land shall provide written notice, prior to the initial application of bulk sewage sludge to a land application site by the applier, to the permitting authority for the State in which the bulk sewage sludge will be applied and the permitting authority shall retain and provide access to the notice. The notice shall include:

(1) The location, by either street address or latitude and longitude, of the land application site.

(2) The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) of the person who will apply the bulk sewage sludge.

§ 503.13 Pollutant limits.

(a) Sewage sludge. (1) Bulk sewage sludge or sewage sludge sold or given away in a bag or other container shall not be applied to the land if the concentration of any pollutant in the sewage sludge exceeds the ceiling concentration for the pollutant in Table 1 of § 503.13.

(2) If bulk sewage sludge is applied to agricultural land, forest, a public contact site, or a reclamation site, either:

(i) The cumulative loading rate for each pollutant shall not exceed the cumulative pollutant loading rate for the pollutant in Table 2 of § 503.13; or

(ii) The concentration of each pollutant in the sewage sludge shall not exceed the concentration for the pollutant in Table 3 of § 503.13.

(3) If bulk sewage sludge is applied to a lawn or a home garden, the concentration of each pollutant in the sewage sludge shall not exceed the concentration for the pollutant in Table 3 of § 503.13.

(4) If sewage sludge is sold or given away in a bag or other container for application to the land, either:

(i) The concentration of each pollutant in the sewage sludge shall not exceed the concentration for the pollutant in Table 3 of § 503.13; or

(ii) The product of the concentration of each pollutant in the sewage sludge and the annual whole sludge application rate for the sewage sludge shall not cause the annual pollutant loading rate for the pollutant in Table 4 of § 503.13 to be exceeded. The procedure used to determine the annual whole sludge application rate is presented in appendix A of this part.

(b) Pollutant concentrations and loading rates—sewage sludge.

(1) Ceiling concentrations.

TABLE 1 OF § 503.13.—CEILING CONCENTRATIONS

Pollutant	Ceiling concentration (milligrams per kilogram) [1]
Arsenic	75
Cadmium	85
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7500

[1] Dry weight basis.

(2) Cumulative pollutant loading rates.

TABLE 2 OF § 503.13.—CUMULATIVE POLLUTANT LOADING RATES

Pollutant	Cumulative pollutant loading rate (kilograms per hectare)
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	100
Zinc	2800

(3) Pollutant concentrations.

TABLE 3 OF § 503.13.—POLLUTANT CONCENTRATIONS

Pollutant	Monthly average concentration (milligrams per kilogram) [1]
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	100
Zinc	2800

[1] Dry weight basis.

(4) Annual pollutant loading rates.

TABLE 4 OF § 503.13.—ANNUAL POLLUTANT LOADING RATES

Pollutant	Annual pollutant loading rate (kilograms per hectare per 365 day period)
Arsenic	2.0
Cadmium	1.9
Copper	75
Lead	15
Mercury	0.85
Nickel	21
Selenium	5.0
Zinc	140

(c) Domestic septage.

The annual application rate for domestic septage applied to agricultural land, forest, or a reclamation site shall not exceed the annual application rate calculated using equation (1).

$$AAR = \frac{N}{0.0026} \quad \text{Eq. (1)}$$

Where:

AAR=Annual application rate in gallons per acre per 365 day period.

N=Amount of nitrogen in pounds per acre per 365 day period needed by the crop or vegetation grown on the land.

[58 FR 9387, Feb. 19, 1993, as amended at 58 FR 9099, Feb. 25, 1994; 60 FR 54769, Oct. 25, 1995]

§ 503.14 Management practices.

(a) Bulk sewage sludge shall not be applied to the land if it is likely to adversely affect a threatened or endangered species listed under section 4 of the Endangered Species Act or its designated critical habitat.

(b) Bulk sewage sludge shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk sewage sludge enters a wetland or other waters of the United States, as defined in 40 CFR 122.2, except as provided in a permit issued pursuant to section 402 or 404 of the CWA.

APPENDIX F

SOURCE 4 LANDFILL 05 (LEROY'S LANE)

APPENDIX F

SITE/RISK CHARACTERIZATION

The site characterization and surface water migration pathway at Landfill 05 (LF-05), also called Leroy's Lane, was assessed by Dames & Moore in the Draft Remedial Investigation (RI) Report dated January 1993. The assessment is based on conditions that existed at LF-05 during the RI fieldwork conducted during June and July of 1992.

Three feet or more of soil, excavated to expand a runway, were placed over the surface of LF-05 in August and September of 1992. This had the effect of burying any surficial contamination that existed prior to that time and raising the elevation of the landfill. Raising the elevation also had the effect of preventing surface water flowing over the landfill (run-on). The risks due to surficial contamination prior to placement of the fill are included in Table F-1. The COCs shown in this table are now considered subsurface contaminants since greater than three feet of native material were placed on top of soils containing contaminants listed in Table F-1. As shown on the table, the carcinogenic risk level of buried soil is $4x10^{-6}$, well within the a conservative range of 10^{-4} to 10^{-6} risks acceptable for closure in accordance with the National Contingency Plan (40 CFR 300). Additionally, virtually all of the potential risk associated with the generation of this risk number is attributed to AAFB background levels of PAH.

There is no risk from the surficial soils because the fill over LF-05 contains clean native soils excavated for runway expansion. Additionally, as stated in Appendix D-1, the PAH and lead emitted from aircraft exhaust are exempt from designation as a hazardous substance under CERCLA, and therefore, are inappropriate for use in the HRS score.

Surface Water Migration Pathway

Prior to performance of the 1992 RI field program and placement of the soil cover over the landfill, discussed above, an assessment was made of surface water runoff patterns at the site. The assessment was made based on site visits and examination of maps and aerial photographs of AAFB and the surrounding area. No streams or surface water bodies are located within 1,000 feet of LF-05. The landfill site is located on a topographic high relative to the surrounding area. Directly to the south and east of LF-05, the topography drops off sharply towards existing off base gravel quarries. Surface water runoff from LF-05 generally flows towards the south and east, where it is intercepted by the gravel quarries.

The closest natural surface water body to LF-05 is an unnamed tributary to Piscataway Creek, located about 1,000 feet (based on visual observation) southeast of the site, off-base and east of the offsite gravel quarries. A drainage ditch referenced in the HRS Documentation Record is located about 1,000 feet to the west of LF-05. This tributary flows south, intersecting Piscataway Creek southeast of the site. The RI assessed the potential for runoff from LF- 05 to migrate and discharge to this unnamed tributary. This was considered improbable because of the existence of quarries located between LF-05 and each of the two unnamed tributaries. These quarries serve as sinks for overland flow. Furthermore, the distance of the tributary from the site, and the dilution, adsorption, precipitation, degradation, and other fate and transport phenomena associated with

Table F-1

Calculated Risks and Hazards and a Comparison of Maximum Concentrations of Contaminants of Concern in Surface Soil with Risk-Based Concentrations (a) Site LF-05, Andrews Air Force Base, Maryland

Source: HRS Documentation Record, Reference 38, Dames & Moore
Draft Remedial Investigation LF05, Vol. 1, Table 6-7, January 1993

Analyte	Exposure Point Concentration (b) (mg/kg)	Max. Detected Concentration (mg/kg)	Carcinogenic RBC (c) (mg/kg)	Carc. RBC exceeded?	Carcinogenic Risk	Noncarc. RBC (mg/kg)	Noncarc. RBC exceeded? (d)	Noncarcinogenic Hazard
Semivolatiles:								
Bis(2-ethyl hexyl) phthalate	16	19	204	No	9E-08	20400	No	8E-04
Butylbenzylphthalate	0.034	0.034	--	--	--	204000	No	2E-07
Dibenzofuran	0.080	0.065	--	--	--	--	--	--
Di-n-Butyl phthalate	0.12	0.052	--	--	--	102000	No	1E-06
Di-n-Octyl phthalate	0.12	0.12	--	--	--	20400	No	6E-06
Acenaphthene	0.18	0.185	--	--	--	61300	No	3E-06
Anthracene	0.23	0.2	--	--	--	307000	No	7E-07
Benzo(a)anthracene	0.88	0.83	2.7	No	3E-07	--	--	--
Benzo(b)fluoranthene	1.1	1	3.19	No	3E-07	--	--	--
Benzo(a)pyrene	0.74	0.71	0.392	Yes	2E-06	--	--	--
Benzo(g,h,i)perylene	0.39	0.39	18.5	No	2E-08	--	--	--
Chrysene	1.1	1.1	89.4	No	1E-08	--	--	--
Dibenzo(a,h)anthracene	0.14	0.14	0.353	No	4E-07	--	--	--
Fluoranthene	2.1	2	--	--	--	40900	No	5E-05
Fluorene	0.10	0.097	--	--	--	40900	No	2E-06
Indeno(1,2,3-cd)pyrene	0.55	0.54	1.41	No	4E-07	--	--	--
2-Methylnaphthalene	0.10	0.043	--	--	--	--	--	--
Naphthalene	0.22	0.077	--	--	--	40900	No	5E-06
Phenanthrene	1.2	1.1	--	--	--	29600	No	4E-05
Pyrene	1.5	1.5	--	--	--	30700	No	5E-05
Pesticides:								
delta-BHC	0.00040	0.00039	--	--	--	--	--	--
alpha-Chlordane	0.024	0.025	2.2	No	1E-08	61.3	No	4E-04
gamma-Chlordane	0.031	0.027	2.2	No	1E-08	61.3	No	5E-04
DDD	0.0080	0.0088	11.9	No	7E-10	--	--	--
DDE	0.0030	0.0029	8.42	No	3E-10	--	--	--
DDT	0.010	0.012	8.42	No	1E-09	511	No	2E-05
Dieldrin	0.037	0.039	0.179	No	2E-07	51.1	No	7E-04
Endrin	0.0026	0.0022	--	--	--	307	No	8E-06
Endrin ketone	0.0054	0.0061	--	--	--	--	--	--
Inorganics:								
Cadmium	0.84	0.83	--	--	--	511	No	2E-03
Lead	160	175	--	--	--	--	--	--
Mercury	0.48	0.49	--	--	--	307	No	2E-03
Nickel	190	188	--	--	--	20400	No	9E-03
Silver	7.4	8.1	--	--	--	5110	No	1E-03
				TOTAL RISK	**4E-06**		**TOTAL HAZARD:**	**2E-02**

(a) Based on the following current land use exposure pathway: The exposure of onsite employees via incidental ingestion of contaminated soil.
(b) The exposure point concentration is the 95% (95% UTL-ed.) on the arithmetic mean unless otherwise indicated.
(c) Carcinogenic RBC value is based on a carcinogenic risk of 1E-06.
(d) Noncarcinogenic RBC value is based on a hazard quotient of 1.

the geochemistry of the quarry would reduce the concentrations of any contaminants which may, if ever, reach the tributary. The HRS Documentation Record, page 71, Table 10, shows that concentrations of PAH and lead in the unnamed tributary are barely detectable, and are well beneath AAFB background levels (HRS Documentation Record, Ref. 32, Table 4-4). These data show that no observed release (above background) occurred to the unnamed tributary. Therefore, no observed release or potential of release based on the potential risks in the subsurface soils in the landfill is associated with LF-05.

Five possible surface water and sediment-related exposure pathways for potential contamination were assessed during the RI (1993). Four of the exposure pathways were direct pathways and one was an indirect pathway. The four direct exposure pathways evaluated were: 1) ingestion of contaminated surface water used as a drinking water source; 2) absorption of contaminants subsequent to dermal contact with surface water or sediment during swimming; 3) inadvertent ingestion of contaminated surface water and/or sediment during swimming; and 4) inhalation of volatile contaminants emitted from surface water during swimming. The one indirect pathway evaluated was consumption of fish that have ingested contaminated surface water, food or sediment.

The HRS Document Record, page 71, Table 10, shows that no releases have occurred to the unnamed tributary of Piscataway Creek, and the potential releases discussed above are within the acceptable risk range. Therefore, pathways 1 through 4 are determined <u>not</u> to be complete under the current land use scenario. The indirect pathway, consumption of contaminated fish, would be complete only if contamination were transported to the unnamed tributary and ultimately to Piscataway Creek, because Piscataway Creek and its tributaries are currently used for recreational fishing. Given the distance of the site from the tributary and the existing potential risks that are equivalent to background risks for PAHs at AAFB, there is no adverse risk due to human exposure to contaminants from LF-05 via the indirect pathway.

APPENDIX G

SOURCE (LF-06 & LF-07) RISK ASSESSMENT

APPENDIX G

SOURCE (LF-06 & LF-07) RISK ASSESSMENT

Introduction

A human health and ecological risk assessment was conducted by EA Engineering, Science, and Technology in 1993 to evaluate potential human health and environmental threats associated with possible discharges into Piscataway Creek from Landfills LF-06 and LF-07 at Andrews Air Force Base (AAFB), Maryland. This work was performed by EA under Air Force Contract F33615-89-D-4002, Order Number 0051 (HRS Documentation Record, Ref. 4, p. 1-1).

The following documentation is a clarification of the risk information contained in the Assessment of Impacts of Landfills LF-06 and LF-07 on Piscataway Creek and Surrounding Area, prepared for the United States Air Force (USAF) by EA Engineering, Science, and Technology (EA) in July 1993 (HRS Documentation Record, Ref. 4). **All references in this Appendix to figures, tables and appendices are to references in Reference 4 of the HRS Documentation Record.**

Andrews AFB is studying a number of sites under the U.S. Air Force Installation Restoration Program (IRP). Piscataway Creek itself is not among these IRP sites but may be impacted by some of them including Landfills LF-06 and LF-07. None of the potentially contaminated sites under investigation at AAFB are currently on the National Priorities List (NPL). However, all work done on this project (was) conducted in accordance with guidance developed for the Comprehensive, Environmental, Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) (HRS Documentation Record, Ref. 4, p.1-1).

A further impetus to study Piscataway Creek was the potential discharge of aqueous film forming foams (AFFFs) into the creek. These foams are used at AAFB in fire response and training exercises (HRS Documentation Record, Ref. 4, p.1-1). Downstream along Piscataway Creek, creek water is used in freeze protection and irrigation at a pick-your-own produce farm. In the spring of 1992, irrigation water sprayed on crops at this farm was suspected of containing AFFF. Since the strawberries at the farm were ready for sale, the question arose as to the toxicity of the AFFF to persons picking and/or consuming the fruit. The EA report addresses the question in the human health risk assessment. In addition, a toxicity profile for AFFF is included as Appendix H to the EA report (HRS Documentation Record, Ref. 4, p.1-1).

Background

Andrews AFB is located 15 miles east of Washington, DC, in the community of Camp Springs, Prince George's County, Maryland (HRS Documentation Record, Ref. 4, Figure 1-1). The Base was first established as Camp Springs Army Air Field in August 1942, and became AAFB in 1947. The base has been the headquarters for the Continental Air Command, the Strategic Air Command, the Military Air Transport Service, and the Air Force Systems Command. The Naval Air Facility has been located at Andrews since 1963 and handles Naval VIP flight operations and photo reconnaissance flights. In 1976, the 1776th Air Base Wing under the Military Airlift

Command (MAC), was established; this made AAFB a MAC Base. The mission of AAFB changed from flight operations to support of numerous operational units when the aircraft inventory was reduced in 1977. Currently the 89th Airlift Wing and the Naval Air Facility are the active units at the Base. Andrews AFB is a main aerial port of entry for military and foreign government officials. Andrews AFB also serves as the home to the official presidential air fleet, including Air Force One.

The main air base covers approximately 4,300 acres within Prince George's County and includes runways, airfield operations, industrial areas, housing, and recreational facilities (HRS Documentation Record, Ref. 4, Figure 1-2). Land use surrounding the Base is residential, commercial, or wooded. Piscataway Creek arises in the vicinity of AAFB and passes through a portion of the Base property. There is concern that contaminants from operations or disposal activities at landfills LF-06 and LF-07 may have resulted in contamination of Piscataway Creek surface water or sediments with possible exposure to biota living in and adjacent to Piscataway Creek. Potential contaminant transport raises additional concerns for human and ecological receptors in downstream and off-base areas.

There are residential and commercial areas to the south of AAFB. Other land use categories in the vicinity of the landfills and Piscataway Creek include croplands, grasslands, wetlands, brushlands, and forests. Individual off-base residences are within several hundred yards of Piscataway Creek in the area where it leaves AAFB.

Piscataway Creek originates in the area which now includes the main runways and the area between the runways. The origin of Piscataway Creek is now a culvert south of the runways. Discharge from this culvert includes natural seeps and springs as well as drainage from the AAFB runways and hangar complexes. Piscataway Creek flows southeast off the base for approximately a mile and a half. It then turns to the south for several miles and then to the southwest to its confluence with the Potomac River. The total length of Piscataway Creek is approximately 17 miles.

Landfill LF-06

Landfill LF-06 was previously used as a disposal site for construction rubble and liquid shop wastes (waste oils, paint thinners, cleaning solvents) from the late 1950s through the late 1960s (Dames and Moore, 1992a). The landfill was covered with unconsolidated fill and is presently a grassy field adjacent to the south end of the AAFB runway. Piscataway Creek lies about 300 ft to the east. There is also a drainage ditch, with an eastward flow towards Piscataway Creek, crossing the center of the site. Since shallow groundwater and surface runoff at LF-06 flow eastward towards Piscataway Creek, the potential exists for contamination from the landfill to migrate and discharge to Piscataway Creek.

Landfill LF-07

Landfill LF-07 was used from the 1960s through the 1980s primarily for disposal of construction rubble (Dames and Moore, 1992b). Miscellaneous wastes including household appliances and furniture, household garbage, tires, hospital materials, and chemical reagents were disposed at the site. Shop wastes also may have been disposed at this site in the past. The landfill has been covered with unconsolidated fill and is now a golf course. LF-07 is bordered by Piscataway Creek to the northeast. Shallow groundwater discharge to Piscataway Creek is likely. The Base Lake is approximately 1,200 ft southwest of the site.

Study Area Investigation

In April and May 1993, field samples and data were collected for use in developing the Human Health and Environmental Risk Assesment. Surface water, sediment, fish, and soil samples were collected from Piscataway Creek, the Base Lake, a tributary stream, and two farm ponds adjacent to AAFB and abutting Piscataway Creek. Samples of ripe strawberries from this same farm were also collected.

Sample Locations

Ten sampling locations were identified in the workplan. The sample locations are depicted in HRS Documentation Record, Reference 4, Figure 2-1. The following paragraphs describe these sample locations.

Location 1 was immediately downstream of the source of Piscataway Creek at the culverts fed by ground water and the drainage system below the runways and hangars. This location was selected to determine baseline conditions of water and sediment at the head of Piscataway Creek. Two water and sediment samples were taken at this location. Biota (fish) samples were not attempted at this location because the habitat was not of a sufficient quality to support a substantial fish population.

Location 2 was in Piscataway Creek immediately downstream of South Perimeter Road and upstream of the point at which output from the Base Lake enters Piscataway Creek. This sampling location was downstream of LF-06 but upstream of LF-07, and results from this location were used to separate the contributions of the individual landfills. Differences between this location and the first location were a measure of the impact of LF-06. Differences between this location and location 4 were a measure of the impact of LF-07. One water and two sediment samples were collected here. In addition, habitat quality in this section of Piscataway Creek was sufficient to obtain one fish tissue sample.

Location 3 was the Base Lake. The lake is fed by an artesian well and empties into Piscataway Creek via intermittent streams and marshy areas. It was important to assess water and sediment character in the Base Lake to determine the contribution (if any) of contaminants from this source to Piscataway Creek. This sampling location served as a reference site. In addition, since the Base Lake is a recreational facility, it was important to assess the water, sediment, and fish tissue quality as potential contributors to human health and ecological risks. Two water, two sediment, and two fish samples were obtained from the Base Lake.

Location 4 was on AAFB, in Piscataway Creek below landfills LF-06 and LF-07. This sample location was below the confluence with the outlet from the Base Lake and above the un-named tributary which enters Piscataway Creek just off the base. Samples collected here assisted in identifying contamination due to the landfills. Since water quality upstream of the landfills (location 1) and in the Base Lake (location 3) established contaminant contributions to Piscataway Creek from non-landfill sources, the difference between concentrations at this point and the upstream locations were used as a measure of contamination due to the landfills. One water, two sediment, and one biota (fish) sample were collected at this point.

Location 5 was in the un-named tributary just before it flowed into Piscataway Creek. This tributary is not impacted by landfills LF-06 and LF-07; therefore, this location served as a reference location against which the results from the creek itself were compared. One water, two sediment, and one fish tissue sample were collected at this sampling location.

Location 6 was in Piscataway Creek where water was obtained for crop irrigation at the farm abutting Piscataway Creek and AAFB. This was a critical location because contaminants identified here could potentially end up in saleable produce for human consumption. Two water, two sediment, and two fish samples were obtained at this location.

Location 7 was in cropland adjacent to Piscataway Creek on the produce farm. It was important to determine residual contaminant concentrations in cropland soil to determine the effect of using water from Piscataway Creek for crop irrigation and to estimate human health risks due to contact with potentially contaminated soil. Two soil samples were taken in the strawberry fields, and one sample was taken across the creek in a wooded area which is not irrigated with water from Piscataway Creek. This latter sample served as a reference sample so that contaminant contributions from Piscataway Creek water could be isolated from background conditions. In addition, since human consumption of crops potentially influenced by water from Piscataway Creek was a principal concern, two samples of consumable portions of crop plants, specifically strawberries, were collected after the fruit was ready to pick.

Location 8 was in the large farm pond abutting Piscataway Creek and AAFB. Like the Base Lake, this pond should not be impacted by landfills on AAFB. Therefore, samples from this location served as a reference location to which results from Piscataway Creek were compared. Two water, two sediment, and two fish tissues samples were obtained from this pond.

Location 9 was is Piscataway Creek just upstream of the point where it crossed Woodyard Road. This location indicated downstream mobility of contaminants in Piscataway Creek arising from potential impact from landfills LF-06 and LF-07. One water, two sediment, and two fish samples were obtained at this location.

Location 10 was added during the sampling event. It was the smaller farm pond near the strawberry fields. The pond is fed by intermittent seeps which come from AAFB. One surface water, one sediment, and one fish sample were collected here.

Study Area Results

The 12 fish, 13 surface water, 17 sediment, two strawberry, three soil, and rinsate and trip blank samples were sent to EA Laboratories the same day that samples were collected. To supplement the analytic chemistry results, field notes taken during site reconnaissance are presented in

Appendix A, and water quality parameters (temperature, pH, dissolved oxygen, conductivity, and alkalinity) collected during the field efforts are listed in Appendix B.

All samples were analyzed for 33 volatile organic compounds (VOCs), 34 base neutral/acid extractable compounds (BNAs), and 15 inorganic compounds, i.e., metals. Two sub-classes of BNAs were analyzed by different methods to achieve lower detection limits. These additional analyses included 19 pesticides, 7 polychlorinated biphenyls (PCBs), and 16 polynuclear aromatic hydrocarbons (PAHs). The compounds for which all fish, water, sediment, strawberry, and soil samples were analyzed are listed in Table 3-1. In this table, the compound 2-methylnaphthalene was listed with the BNAs. This compound is a PAH, but because it was not analyzed by the method to achieve lower detection limits, it was listed with other BNAs.

In addition to this extensive list of compounds, some samples were subject to additional analyses. Fish samples were analyzed for lipid percent. Water samples were analyzed for COD, hardness, ammonia, nitrate/nitrite, and sulfate, as well as the water quality parameters listed in Appendix B. The water samples were also field filtered, and both filtered and unfiltered samples were analyzed in the laboratory. This resulted in dissolved and total concentrations for the water samples. Sediment and soil samples were analyzed for AVS:SEM ratio, solid content, and total organic carbon.

Analytic results are given in Appendixes C-G for each environmental medium. These data listings include only those compounds which were detected in that medium. Any compounds not listed in these tables were not detected in any sample of that medium.

Fish Tissue Analytic Results

Appendix C lists the analytic data for the 12 fish samples collected for this study. All compounds detected in any fish sample are included in this appendix. All of these compounds are potential chemicals of concern. This complete list of detected compounds was shortened by the elimination of acetone, bis(2-ethylhexyl)phthalate, and di-n-butyl phthalate. While acetone was detected in every fish sample, it was a field contaminant, because the foil used to wrap each fish was rinsed with acetone. The two phthalate compounds were eliminated because they were also detected in corresponding blank samples and are either field or laboratory contaminants.

Two other VOCs (methylene chloride and toluene) were retained in the human health risk assessment even though they were detected in only one sample.

Ten PAHs were detected in the fish samples in 1 through 9 samples, depending on the PAH. Four pesticides, two PCBs, and three other BNAs were detected in the fish samples. Bis(2-ethylhexyl)phthalate and di-n-butyl phthalate were also found in blank samples Similarly, the BNA di-n-octyl phthalate was detected once at a concentration of 41 μg/kg. The average concentrations of 2-butanone and PAHs in the fish tissue samples appear to be higher at the downstream location than at other sampling locations.

Of the pesticides and PCBs, DDD, and heptachlor epoxide were each detected in only one fish sample, but dieldrin was detected in 9 samples (75 percent). DDE and the two PCBs were each detected in 11 samples (92 percent). The average pesticide and PCB concentrations appear to be somewhat higher at the upstream locations.

Twelve of the 15 metals analyzed for were detected in fish. Each metal was detected in 4 to 12 of the samples (33 to 100 percent). The highest average concentration varies among the location types by metal. Because the upstream Piscataway Creek locations did not stand out as having the highest concentrations, the decision was made to combine all fish data for purposes of the human health risk assessment. If the risk assessment combining all sampling locations demonstrated risk, then the assessment would be repeated using data from individual areas to determine if any one area was responsible for unacceptable risk.

Surface Water Analytic Results

Analytic results of the 13 surface water samples are listed in Appendix D. Very few organic compounds were detected in any water sample. No VOCs, PAHs, pesticides, or PCBs were detected in surface water. Only three organic compounds were detected in surface water. Diethylphthalate was eliminated as a chemical of concern because it was also detected in corresponding blank samples. Bis(2-ethylhexyl)phthalate and di-n-butyl-phthalate were observed several times but at very low levels. However, both compounds were retained in the human health risk assessment.

In the surface water samples, 10 metals were detected in the total (unfiltered) samples and 9 metals were detected in the dissolved (filtered) samples. Following EPA guidance, the total metal concentrations were used in the human health risk assessment, even though only the dissolved concentration is available to the receptor.

Sediment Analytic Results

Data from the 17 sediment samples are presented in Appendix E. Several of the compounds detected in sediment (Appendix E) were eliminated because they were detected in corresponding blank samples. These include methylene chloride, bis(2-ethylhexyl)phthalate, di-n-butyl-phthalate, and diethylphthalate.

Three VOCs were detected in sediment samples. However, methylene chloride was also detected in corresponding blank samples, and chlorobenzene was detected only once, at a concentration of 2 µg/kg. Several other compounds (chlorobenzene, dibenz[a,h]anthracene, di-n-octyl phthalate, and 2-methylnaphthalene) were retained in the risk assessment, even though they were detected infrequently and at concentrations much lower than the corresponding CRDLs.

Fifteen PAHs were detected in from 1 to 10 of the sediment samples. No pesticides or PCBs were detected, but 8 other BNAs were detected. These included bis(2-ethylhexyl)phthalate, diethylphthalate, and di-n-butyl phthalate, which were also detected in blank samples.

Each of the 15 metals analyzed for was detected in at least one sediment sample.

Strawberry Analytic Results

Strawberry results are presented in Appendix F. The first sample was as picked in the field. The second strawberry sample was dipped in Piscataway Creek at sampling location 6, the point where irrigation water is withdrawn from the creek. Few compounds were detected in these two samples. No VOCs, pesticides, or PCBs were detected in either sample. The PAHs chrysene and dibenz[a,h]anthracene were detected in low levels in one of the samples. Bis(2-ethylhexyl)phthalate was detected in one of the samples. Di-n-butyl phthalate was detected in the samples but also in the laboratory blank and is therefore a laboratory contaminant. All compounds except di-n-butyl phthalate were retained in the human health risk assessment.

Six metals were detected in one or both strawberry samples.

Soil Analtyic Results

Appendix G contains the results of the three soil samples. No VOCs, pesticides, nor PCBs were detected in these samples. Eleven PAHs and 12 metals were detected. In addition, two phthalates were detected but were also detected in blank samples, and are therefore likely to be laboratory contaminants.

All of the PAHs and metals detected in any of the three soil samples were retained in this risk assessment. Since the phthalate compounds were detected in blank samples, they were not carried through the assessment.

Ecological Risk Assessment

This section describes the ecological risk assessment performed for the upper Piscataway Creek. The components which are described include selection of receptors of concern (ROCs), selection of compounds of concern (COCs), identification of benchmarks for comparison of estimated exposures (toxicity reference values), and risk evaluation for aquatic and terrestrial components of the ecosystem. Data characterizing the area were obtained in accordance with the April 1993 workplan, quality assurance project plan, and health and safety plan. Sampling was performed in April 1993. The sampling effort was preceded by a period of heavy rain and increased flows in the upper Piscataway Creek. Because this is normal for the area and time of year, the samples obtained were deemed to be representative.

Ecological Risk Assessment Summary and Conclusions

Based on the samples collected and the output of the developed model, no contaminants were found to present unacceptable risks to ecological receptors from water or sediments. Although mercury and lead were calculated to be above the ambient water quality criteria in sediment porewater, sufficient acid volatile sulfide (AVS) exists in these sediments to suggest that this calculation (based on equilibrium partitioning) is too simplistic to account for AVS effects, which should reduce bioavailable amounts to well below the ambient water quality criteria (AQWC). While the potential risks attributable to lead may be overestimated, information is not currently sufficient to determine that these potential risks do not exist. Phenanthrene and pyrene are most probably products of jet exhaust, since the area is in the jet glide path. It is probable that the source of these compounds is not LF-06 or LF-07. In addition, given the magnitude of the exceedances (HQ = 4.4 and 2.6), further investigation is probably not warranted.

Compounds modeled from fish tissues and soil through the terrestrial food-web did not produce hazard quotients of sufficient magnitude to suggest that, even when accounting for uncertainty, any unacceptable risks to ecological receptors exist in the upper Piscataway Creek area.

Human Health Risk Assessment

The purpose of this human health risk assessment is to evaluate risks from exposure to contaminants in or coming from Piscataway Creek and surrounding areas near AAFB. If there is a risk to human health, then this risk may be attributable to chemicals originating in either Landfill LF-06 or LF-07 on AAFB.

It should be stressed that AAFB is not on the National Priorities List (NPL), i.e., it is not a Superfund site. While no sites on or along Piscataway Creek are part of the Installation Restoration Program (IRP), Landfills LF-06 and LF-07 are IRP sites. Recognizing that AAFB is not on the NPL list, this risk assessment has nonetheless been prepared in accordance with recommended guidance from the U.S. Environmental Protection Agency (EPA) for evaluating potential public health risks associated with Superfund sites. This guidance was followed because it is the definitive guidance for performing human health risk assessments. Considerable professional judgment also must be used in application of this guidance to human health risk assessments such as this study focusing on Piscataway Creek and its environs.

Hazard Identification and Data Evaluation

This human health risk assessment used the analytic data from samples collected by EA in April and May of 1993 in the following environmental media: fish, surface water, sediment, strawberries, and surficial soil. These data were used to quantify risks to humans posed by contaminants present in and around Piscataway Creek. The quantitative estimates of carcinogenic and non-carcinogenic risks were conservative in that they represented the maximum risk likely to be encountered in the area in and around the headwaters of Piscataway Creek where the impacts, if any, of Landfills LF-06 and LF-07 were expected (HRS Documentation Record, Ref. 4, Section 5-6).

Summary and Conclusions

Tables 5-22 and 5-24 (HRS Documentation Record, Ref. 4) summarize the quantitative estimates of noncarcinogenic and carcinogenic risk respectively. These estimates were conservative in that they represented the maximum risk likely to be encountered in the area in and around the headwaters of Piscataway Creek where the impacts, if any, of Landfills LF-06 and LF-07 were expected.

Noncarcinogenic Risk

Table 5-22 shows that noncarcinogenic risks for adults who consume fish from Piscataway Creek and surrounding waters and who consume strawberries from the pick-your-own produce farm were all less than 1, i.e., these risks were acceptable. The sum of these risks was also less than 1. The conservatism of this assessment is demonstrated by the fact that the same adults are not likely to both eat the maximum amount of fish assumed in this assessment as well as the maximum quantity of strawberries from the farm using irrigation water from Piscataway Creek. The human health risk assessment showed that even if the same persons consumed both fish and strawberries, noncarcinogenic risk was acceptable, i.e., the cumulative hazard index (HI) for adults was less than 1.

The noncarcinogenic risk for children who play in stream was acceptable, i.e., the HI for all three potential pathways was less than 1.

Because the HIs were less than 1 even for the conservative exposure scenarios evaluated here, none of the exposure pathways warranted further refinement.

Carcinogenic Risk

Table 5-24 shows that the total excess cancer risk for adults exposed to compounds in and around Piscataway Creek is 1×10^{-4}, the upper bound of the target risk range for setting Superfund cleanup goals. While this risk was on the upper end of the acceptable range, this risk was attained only if it was assumed that the same adults ate large quantities of both fish and strawberries. Because the scenarios assessed here represent maximum exposure and it is unlikely that any one person eats both the maximum amount of fish and the maximum amount of strawberries, the actual risk is lower than the maximum risk estimated here. This total excess lifetime cancer risk is well within the acceptable risk range established for Superfund cleanup goals.

The total excess lifetime cancer risk for children who play in the stream is acceptable, i.e., the risk is 1×10^{-7}. This is less than 1×10^{-6}, the lower bound of the target risk range for setting Superfund cleanup goals.

The conclusion of the human health risk assessment is that Piscataway Creek and its environs do not pose unacceptable risk to people eating fish and picking and eating strawberries from the area, nor to children playing in Piscataway Creek, the Base Lake, the farm ponds, or the unnamed tributary. Since the creek and other waters and surrounding areas do not pose either noncarcinogenic nor carcinogenic risk, there is no adverse impact from Landfills LF-06 and LF-07 on Piscataway Creek or the surrounding areas.

Risk Assessment Conclusions

This report described the study undertaken to assess impacts to Piscataway Creek from Landfills LF-06 and LF-07 on AAFB. Fish, surface water, and sediment samples were collected from nine locations along Piscataway Creek, an unnamed tributary, the Base Lake, and two farm ponds. Strawberry and soil samples were collected from a pick-your-own produce farm which draws irrigation and frost-protection water from Piscataway Creek just after it leaves AAFB. These data were used in ecological and human health risk assessments.

There are uncertainties associated with the risk assessment process, because it is not possible to know exactly what the exposure of every receptor considered in the assessment will be. This uncertainty was accounted for in both the ecological and human health assessments by making conservative assumptions concerning exposure and toxicity. The result of this conservatism was to overestimate risk and thereby compensate for any risk which might be missed by simplification of exposure scenarios.

Conclusions of the Ecological Risk Assessment

The ecological assessment in Chapter 4 concluded that the hazard quotients for all compounds of concern in surface water were below 1. This indicated that there were no apparent risks from any compounds in the surface water of Piscataway Creek, the unnamed tributary, the Base Lake or the farm ponds.

In sediment, the ecological assessment identified lead and mercury in sediment porewater as potential risks. Exposure in sediment is controlled by simultaneously extracted metal/acid volatile sulfide (SEM/AVS) ratios which are indicators of potential sediment toxicity. According to modeled calculations, mercury and lead could potentially exceed AWQC in sediment porewater. However, sufficient AVS exists in the sediments to suggest that bioavailable amounts of mercury and lead should be reduced to well below the AWQC.

The ecological assessment showed that phenanthrene and pyrene in sediment also had some potential for unacceptable risks to aquatic receptors. These compounds are most probably products of jet exhaust, and it is not likely that the source of these compounds is either of the landfills in question. In addition, the magnitude of the hazard quotients for these compounds indicates that these compounds in this medium do not warrant further investigation.

The results of the terrestrial assessment for the upper Piscataway Creek area demonstrated that there was no unacceptable risk for terrestrial receptors. Compounds modeled from fish tissue and soil through the terrestrial food-web produced hazard quotients well below a magnitude to suggest that, even when accounting for uncertainty, there would be any unacceptable risks to ecological receptors in the upper Piscataway Creek area.

Conclusions of the Human Health Risk Assessment

The human health risk assessment in Chapter 5 demonstrated that there was no appreciable risk associated with any of the pathways of concern for persons in the vicinity of Piscataway Creek as it leaves AAFB. Risk was quantified for two groups, adults and children. The assessment assumed that the adults picked and ate large quantities of strawberries from the pick-your-own produce farm and regularly consumed fish from the upper reaches of Piscataway Creek, the unnamed tributary, the Base Lake, or the farm ponds. The children were assumed to play in Piscataway Creek and/or the other waters included in this study 70 days each year for 9 years. They were assumed to incidently ingest and be dermally exposed to surface water and sediment.

All noncarcinogenic risks estimated in the human health risk assessment for both adults and children were less than 1, indicating that no adverse noncarcinogenic effects are anticipated from exposure to compounds in fish, surface water, sediment, strawberries, or soil.

Carcinogenic risk for adults who consumed large quantities of both fish and strawberries was 1×10^{-4}, the upper bound of the target risk range for setting Superfund cleanup goals. While this risk was on the upper end of the acceptable risk range, this risk was attained only if it was assumed that the adults both ate fish from the creeks and ponds and picked and ate strawberries from the produce farm. Because each of the exposure scenarios represented maximum exposure and it is unlikely that one person would experience the maximum exposure of any one scenario, let alone from all three scenarios simultaneously, the actual carcinogenic risk is likely to be much lower than the upper-bound acceptable risk estimated here.

The total excess lifetime cancer risk for adults consuming fish was driven by dieldrin and PCBs. The concentrations of these three compounds in fish from the Base Lake and farm ponds is approximately half that in fish from Piscataway Creek. The average level in Piscataway Creek is approximately that used in this risk assessment. Because the average fish concentrations in the Base Lake and the farm ponds was half that used in the risk assessment, the cancer risk from consuming fish from the Base Lake and farm ponds is approximately half that estimated for the entire study area.

The Piscataway is a relatively small creek, especially at its head where this study took place. While fishing may take place in this creek, it is not a particularly attractive or productive fishing spot. During field work, no evidence was observed that fishing takes place in the upper reaches of Piscataway Creek. People may fish here and may even eat the fish caught from the creek; however, it is not likely that fish are regularly consumed from this source. The assessment took the nature of the creek into account in developing site-specific exposure assumptions such as 26 fish meals/year from the creek. While this is a possible scenario, it is considered to be conservative, i.e., it is likely to overestimate the amount of fish eaten from this creek. This is turn overestimates risk from this exposure pathway.

The total excess cancer risk for children was estimated to be 1×10^{-7}, even less than the lower bound of the target risk range for setting Superfund goals.

The conclusion of the human health risk assessment is that Piscataway Creek and its environs do not pose unacceptable risk to people eating fish and picking and eating strawberries from the area, nor to children playing in Piscataway Creek, the Base Lake, the farm ponds, or the unnamed tributary. Because the creek and other waters and surrounding areas pose neither noncarcinogenic nor carcinogenic risk, there is no adverse impact of Landfills LF-06 and LF-07 on Piscataway Creek or the surrounding areas.

Conclusions Regarding AFFF

The toxicity profile of AFFFs in Appendix H concludes that exposure to AFFF in Piscataway Creek or on the abutting produce farm is not likely to be harmful to mammals. Further, the concentrations encountered on the farm are likely to be much more dilute that any concentrations at which adverse effects were observed in test animals.

The environmental impacts of AFFF to aquatic organisms in Piscataway Creek are not as clear. The manufacturer recommends water treatment or substantial dilution of these compounds in order to ensure that there will be no adverse impacts to aquatic organisms. No foaming compounds were observed in the creek during site reconnaissance or field work. Further, sampling in the creek resulted in the collection of some rather large fish, indicating that the aquatic community is healthy.

Pesticides and PCBs in Piscataway Creek

As in many human health risk assessments, the cancer risk drives the risk assessment conclusions, i.e., the cancer risks are higher, or are perceived to be higher, than the noncarcinogenic risks. For the human health pathways evaluated here, the largest contributions to the cancer risk were from dieldrin and PCBs in fish. The following discussion puts these risks into perspective.

EPA recently reported on the National Study of Chemical Residues in Fish (EPA 1992f). This study was a one-time screening investigation to determine the prevalence of selected bioaccumulative pollutants in fish. Dieldrin and PCBs were both among the top ten pollutants in terms of most frequently detected compounds at the 362 study sites. PCBs were detected at 91.4 percent of the sites and dieldrin at 60.2 percent. Table 6-1 (HRS Documentation Record, Ref. 4) presents average and maximum concentration of these compounds in the national study and in this study of Piscataway Creek. It is evident that the levels detected in this study of Piscataway Creek are far lower than those detected in the national study. The conclusion here is not that it is acceptable to find these compounds in fish, but that it is not surprising to do so.

A further comparison to lend perspective to the concentrations of these compounds detected in fish in this study is a comparison with Food and Drug Administration (FDA) tolerances or action levels. Tolerances are legally binding limits established by formal rulemaking procedures, including publication of the proposed rule and the opportunity for public comment. Action levels, on the other hand, are not formally established and are not legally binding. They raise a red flag that food may be considered adulterated. Both tolerances and action levels are based on the unavoidability of the contamination and do not represent permissible levels of contamination where it is avoidable. They represent limits at or above which FDA will take legal action to remove products from the market.

The FDA action level for dieldrin is 300 µg/kg. The maximum dieldrin observation in this study was 30 µg/kg. The average dieldrin concentration in Piscataway Creek was 14 µg/kg, and the average in both the Base Lake and the farm ponds is 3.0 µg/kg, two orders of magnitude less than the FDA action level.

The FDA tolerance for PCBs in the edible portion of fish and shellfish is 2 ppm. This is equivalent to 2,000 µg/kg. The average of each PCB concentration in Piscataway Creek was about 50 µg/kg. The average of each PCB concentration in the Base Lake and the farm ponds was 25 µg/kg, again far lower than the FDA tolerance level.

The conclusion of both the risk assessment and these comparisons to FDA levels is that there is little potential for risk to humans posed by eating fish from Piscataway Creek, the Base Lake, the tributary or the farm ponds.

APPENDIX H

ASSESSMENT OF PISCATAWAY CREEK FLOW

Appendix H

Assessment of Piscataway Creek Flow

In accordance with pages 238 and 239 of the HRS Guidance Manual (EPA 1992), Piscataway Creek flow was estimated to be 19.88 cubic feet per second (cfs), 4.5 miles downstream from the headworks.

Using a planimeter, the drainage area of Piscataway Creek up to the “area of critical state concern” identified in the HRS Documentation Record, Ref. 34, is approximately 18 square miles. The distance to the area of critical state concern is approximately 4.5 miles from the headworks of Piscataway Creek. See attached map for the drainage area. The map is photocopied from the United States Geological Survey (USGS) quadrangle topographic maps.

The average annual runoff value is 15 inches for Andrews AFB (USGS Map of the Average Annual Runoff in the United States listed on page 25 of *Water Resources Engineering*, Linsley/Franzini, 1979)*. To convert the average annual runoff value to cfs per square mile, the average runoff is multiplied by 0.07362 (page 238 of the HRS Guidance Manual, EPA 1992). Fifteen (15) multiplied by 0.07362 equals 1.1043 cfs per square mile. To find the flow in the creek, 18 square miles is multiplied by 1.1043 cfs per square mile, which equals 19.88 cfs. See calculations below.

15 inches x 0.07362 = 1.1043 cfs per square mile

1.1043 cfs per square mile x 18 square miles = 19.88 cfs

When Piscataway Creek reaches the beginning of the “area of critical state concern”, the flow in Piscataway Creek is 19.88 cfs. Therefore, the dilution factor for Piscataway Creek at that point is 0.1 (Table 4-13 on page 51613 of the HRS Final Rule, Ref. 1).

* Page 238 of the HRS Guidance Document recommends using average annual runoff maps, such as the *Average Annual Runoff in the United States*, which is published by the USGS, to calculate an estimate of a regional unit flow value. A USGS Average Annual Runoff map was found in *Water Resources Engineering*.

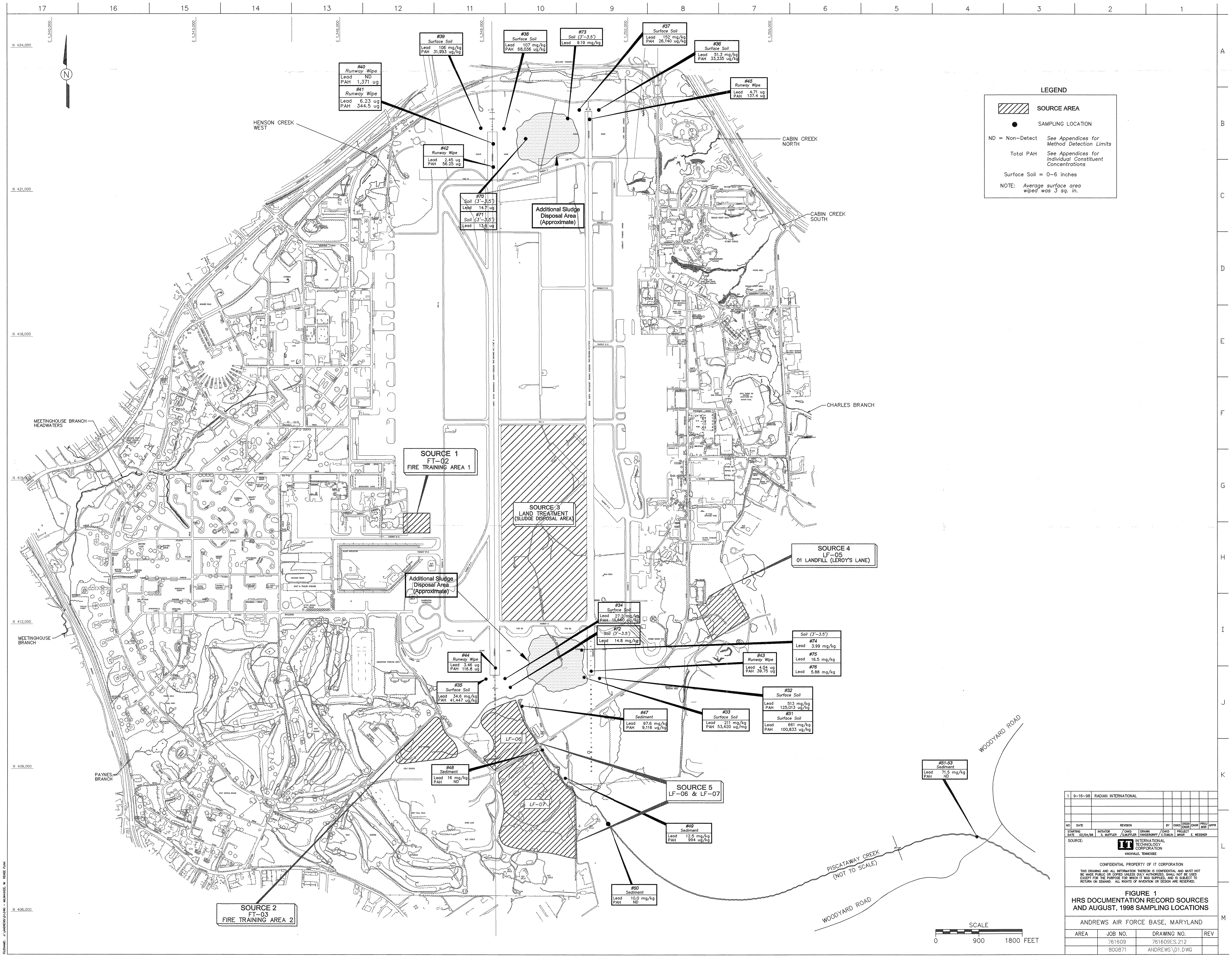
Drainage Area of Piscataway Creek from the Headworks to 4.5 Miles Downstream

Map photocopied from the Anacostia, Upper Marlboro, and Brandywine 7.5 Minute Series (Topographic) Maps

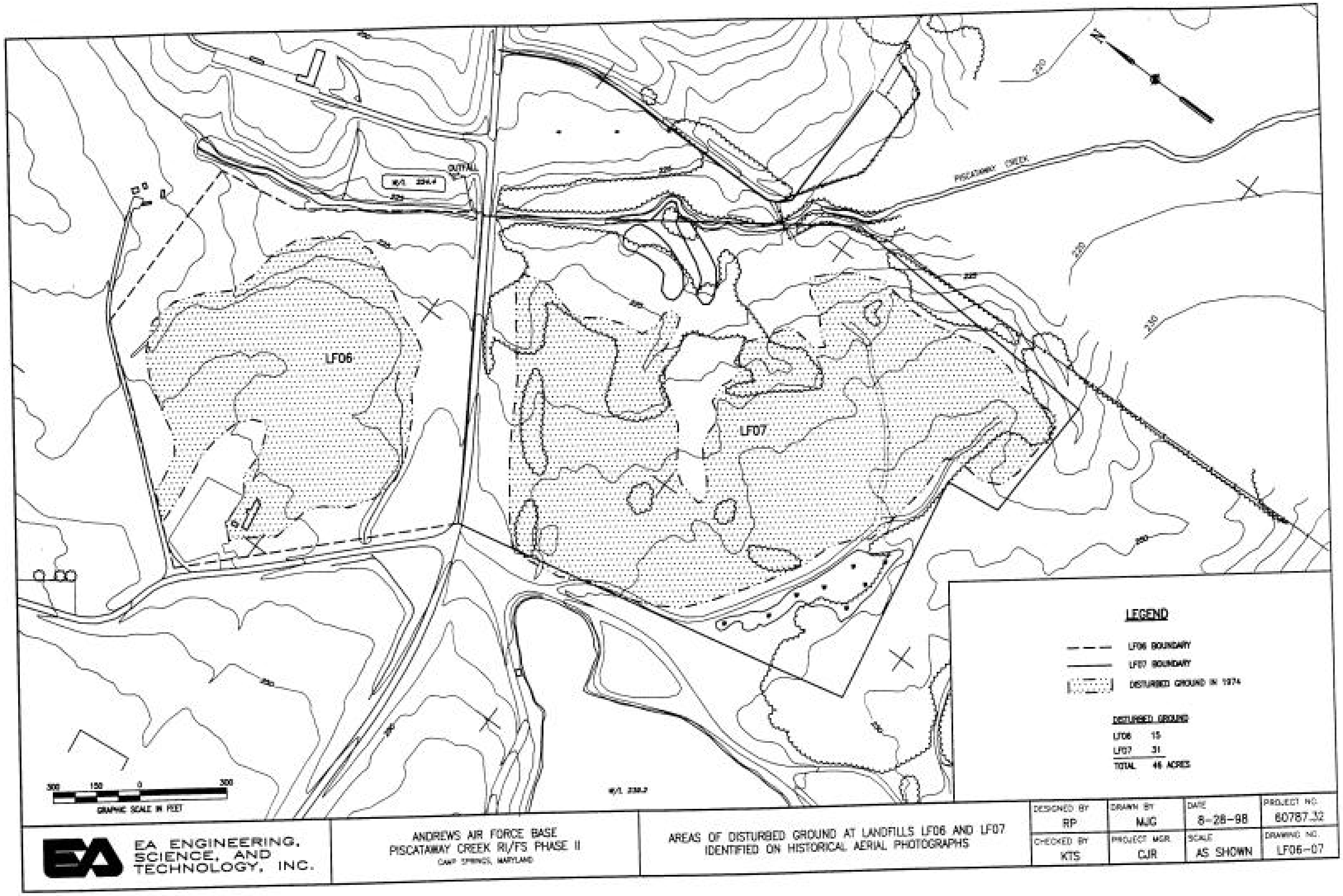
APPENDIX I

FIGURES

HRS Sources and August 1998 Sampling Locations



LEGEND
SOURCE AREA
SAMPLING LOCATION
ND = Non-Detect See Appendices for Method Detection Limits
Total PAH See Appendices for Individual Constituent Concentrations
Surface Soil = 0–6 inches
NOTE: Average surface area wiped was 3 sq. in.
#39 Surface Soil Lead 106 mg/kg PAH 31,993 ug/kg
#38 Surface Soil Lead 107 mg/kg PAH 68,036 ug/kg
#73 Soil (3'–3.5') Lead 9.19 mg/kg
#37 Surface Soil Lead 152 mg/kg PAH 26,140 ug/kg
#36 Surface Soil Lead 51.3 mg/kg PAH 33,235 ug/kg
#40 Runway Wipe Lead ND PAH 1,371 ug
#41 Runway Wipe Lead 6.23 ug PAH 344.5 ug
#45 Runway Wipe Lead 4.71 ug PAH 137.4 ug
#42 Runway Wipe Lead 2.45 ug PAH 56.25 ug
#70 Soil (3'–3.5') Lead 14.7 ug
#71 Soil (3'–3.5') Lead 13.9 ug
Additional Sludge Disposal Area (Approximate)
HENSON CREEK WEST
CABIN CREEK NORTH
CABIN CREEK SOUTH
CHARLES BRANCH
MEETINGHOUSE BRANCH HEADWATERS
MEETINGHOUSE BRANCH
PAYNES BRANCH
SOURCE 1 FT-02 FIRE TRAINING AREA 1
SOURCE 3 LAND TREATMENT (SLUDGE DISPOSAL AREA)
SOURCE 4 LF-05 01 LANDFILL (LEROY'S LANE)
Additional Sludge Disposal Area (Approximate)
#34 Surface Soil Lead 27.2 mg/kg PAH 15,660 ug/kg
#72 Soil (3'–3.5') Lead 14.8 mg/kg
Soil (3'–3.5') #74 Lead 3.99 mg/kg #75 Lead 16.5 mg/kg #76 Lead 5.88 mg/kg
#44 Runway Wipe Lead 3.46 ug PAH 116.8 ug
#43 Runway Wipe Lead 4.04 ug PAH 39.75 ug
#35 Surface Soil Lead 34.6 mg/kg PAH 41,447 ug/kg
#32 Surface Soil Lead 513 mg/kg PAH 125,013 ug/kg
#31 Surface Soil Lead 661 mg/kg PAH 100,833 ug/kg
#47 Sediment Lead 97.6 mg/kg PAH 9,116 ug/kg
#33 Surface Soil Lead 211 mg/kg PAH 53,420 ug/mg
LF-06
LF-07
#48 Sediment Lead 16 mg/kg PAH ND
SOURCE 5 LF-06 & LF-07
#49 Sediment Lead 12.5 mg/kg PAH 994 ug/kg
#50 Sediment Lead 10.0 mg/kg PAH ND
#51-53 Sediment Lead 71.5 mg/kg PAH ND
WOODYARD ROAD
PISCATAWAY CREEK (NOT TO SCALE)
WOODYARD ROAD
SOURCE 2 FT-03 FIRE TRAINING AREA 2
SCALE 0 900 1800 FEET
1 9-16-98 RADIAN INTERNATIONAL
INTERNATIONAL TECHNOLOGY CORPORATION KNOXVILLE, TENNESSEE
CONFIDENTIAL PROPERTY OF IT CORPORATION
FIGURE 1
HRS DOCUMENTATION RECORD SOURCES AND AUGUST, 1998 SAMPLING LOCATIONS
ANDREWS AIR FORCE BASE, MARYLAND
AREA JOB NO. DRAWING NO. REV
761609 761609ES.212
800871 ANDREWS\D1.DWG


LF06
LF07
PISCATAWAY CREEK
OUTFALL
LEGEND
LF06 BOUNDARY
LF07 BOUNDARY
DISTURBED GROUND IN 1974
DISTURBED GROUND
LF06 15
LF07 31
TOTAL 46 ACRES
300 150 0 300
GRAPHIC SCALE IN FEET
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.
ANDREWS AIR FORCE BASE
PISCATAWAY CREEK RI/FS PHASE II
CAMP SPRINGS, MARYLAND
AREAS OF DISTURBED GROUND AT LANDFILLS LF06 AND LF07
IDENTIFIED ON HISTORICAL AERIAL PHOTOGRAPHS
DESIGNED BY RP
DRAWN BY MJC
DATE 8-28-98
PROJECT NO. 60787.32
CHECKED BY KTS
PROJECT MGR. CJR
SCALE AS SHOWN
DRAWING NO. LF06-07

APPENDIX J

SAMPLING RESULTS

Metals Soil/Sediment (15 pages)
PAH Runway Wipe (7 pages)
PAH Soil/Sediment (17 pages)
Lead Runway Wipe (2 pages)

The data in this appendix are third party, independent quality control data that meet EPA's Contract Lab Program QC Requirements.

METHOD 3050B/6010B

METALS BY ICP

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
SDG NO. : 98H132	Date Extracted: 08/27/98 18:30
Sample ID: 0046	Date Analyzed: 08/28/98 02:19
Lab Samp ID: H132-23	Dilution Factor: 1
Lab File ID: I07H045013	Matrix : SOIL
Ext Btch ID: IPH044S	% Moisture : 31.5
Calib. Ref.: I07H045007	Instrument ID : EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	3260	22	6.24
Antimony	ND	10	3.58
Arsenic	4.64F	40	3.26
Barium	47.3	1	.13
Beryllium	.367F	1	.02
Cadmium	1.72	.5	.07
Calcium	1090	100	1.99
Chromium	12.1F	20	.6
Cobalt	5.42F	10	.61
Copper	17.4	2	.74
Iron	30400	3	.72
Lead	67.8	10	2.35
Magnesium	736	100	5.26
Manganese	110	2	.12
Molybdenum*	2.26F	3	.65
Nickel	7.18	2	.46
Potassium	487F	600	194
Silver	ND	3	1.41
Sodium	53.6	10	6.39
Vanadium	11	1	.83
Zinc	107	1	.26

RL: Reporting Limit

* Analyzed on 8/28/98 16:15 File I07H046

METHOD 3050B/6010B
METALS BY ICP

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
SDG NO.	: 98H132	Date Extracted:	08/27/98 18:30
Sample ID:	0047	Date Analyzed:	08/28/98 02:23
Lab Samp ID:	H132-24	Dilution Factor:	1
Lab File ID:	I07H045014	Matrix	: SOIL
Ext Btch ID:	IPH044S	% Moisture	: 57.8
Calib. Ref.:	I07H045007	Instrument ID	: EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	3800	22	6.24
Antimony	6.8F	10	3.58
Arsenic	7.88F	40	3.26
Barium	47.8	1	.13
Beryllium	.401F	1	.02
Cadmium	1.39	.5	.07
Calcium	1130	100	1.99
Chromium	19.4F	20	.6
Cobalt	4.56F	10	.61
Copper	21.3	2	.74
Iron	27800	3	.72
Lead	97.6	10	2.35
Magnesium	1110	100	5.26
Manganese	93	2	.12
Molybdenum*	ND	3	.65
Nickel	13	2	.46
Potassium	796	600	194
Silver	ND	3	1.41
Sodium	28.2	10	6.39
Vanadium	12.9	1	.83
Zinc	111	1	.26

RL: Reporting Limit
* Analyzed on 8/28/98 16:19 File I07H046

METALS BY ICP

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
SDG NO. : 98H132	Date Extracted: 08/27/98 18:30
Sample ID: 0048	Date Analyzed: 08/28/98 02:27
Lab Samp ID: H132-25	Dilution Factor: 1
Lab File ID: I07H045015	Matrix : SOIL
Ext Btch ID: IPH044S	% Moisture : 33.4
Calib. Ref.: I07H045007	Instrument ID : EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	5610	22	6.24
Antimony	ND	10	3.58
Arsenic	10.8F	40	3.26
Barium	19.8	1	.13
Beryllium	.249F	1	.02
Cadmium	.188F	.5	.07
Calcium	1180	100	1.99
Chromium	24.2	20	.6
Cobalt	1.75F	10	.61
Copper	6.65	2	.74
Iron	19800	3	.72
Lead	16	10	2.35
Magnesium	788	100	5.26
Manganese	59.7	2	.12
Molybdenum^	10.1	3	.65
Nickel	3.62	2	.46
Potassium	1090	600	194
Silver	ND	3	1.41
Sodium	58.1	10	6.39
Vanadium	21.5	1	.83
Zinc	49.6	1	.26

RL: Reporting Limit
^ Analyzed on 8/28/98 16:23 File I07H046

METHOD 3050B/6010B
METALS BY ICP

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
SDG NO. : 98H132	Date Extracted: 08/27/98 18:30
Sample ID: 0049	Date Analyzed: 08/28/98 02:31
Lab Samp ID: H132-26	Dilution Factor: 1
Lab File ID: I07H045016	Matrix : SOIL
Ext Btch ID: IPH044S	% Moisture : 21.8
Calib. Ref.: I07H045007	Instrument ID : EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	561	22	6.24
Antimony	ND	10	3.58
Arsenic	ND	40	3.26
Barium	6.34	1	.13
Beryllium	.0504F	1	.02
Cadmium	.237F	.5	.07
Calcium	146	100	1.99
Chromium	4.94F	20	.6
Cobalt	2.71F	10	.61
Copper	2.07	2	.74
Iron	3930	3	.72
Lead	12.5	10	2.35
Magnesium	949	100	5.26
Manganese	136	2	.12
Molybdenum*	ND	3	.65
Nickel	7.57	2	.46
Potassium	ND	600	194
Silver	ND	3	1.41
Sodium	ND	10	6.39
Vanadium	2.31	1	.83
Zinc	35.6	1	.26

RL: Reporting Limit
* Analyzed on 8/28/98 16:27 File I07H046

METHOD 3050B/6010B
METALS BY ICP

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
SDG NO. : 98H132	Date Extracted: 08/27/98 18:30
Sample ID: 0050	Date Analyzed: 08/28/98 02:35
Lab Samp ID: H132-27	Dilution Factor: 1
Lab File ID: I07H045017	Matrix : SOIL
Ext Btch ID: IPH044S	% Moisture : 19.0
Calib. Ref.: I07H045007	Instrument ID : EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	2950	22	6.24
Antimony	ND	10	3.58
Arsenic	ND	40	3.26
Barium	18.4	1	.13
Beryllium	.109F	1	.02
Cadmium	ND	.5	.07
Calcium	414	100	1.99
Chromium	4.04F	20	.6
Cobalt	ND	10	.61
Copper	2.22	2	.74
Iron	2460	3	.72
Lead	10	10	2.35
Magnesium	223	100	5.26
Manganese	10.7	2	.12
Molybdenum*	1.53F	3	.65
Nickel	1.57F	2	.46
Potassium	252F	600	194
Silver	ND	3	1.41
Sodium	30.6	10	6.39
Vanadium	4.68	1	.83
Zinc	8.16	1	.26

RL: Reporting Limit
* Analyzed on 8/28/98 16:31 File I07H046

METHOD 3050B/6010B
METALS BY ICP

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
SDG NO.	: 98H132	Date Extracted:	08/27/98 18:30
Sample ID:	0051	Date Analyzed:	08/28/98 02:39
Lab Samp ID:	H132-28	Dilution Factor:	1
Lab File ID:	I07H045018	Matrix	: SOIL
Ext Btch ID:	IPH044S	% Moisture	: 20.5
Calib. Ref.:	I07H045007	Instrument ID	: EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	895	22	6.24
Antimony	ND	10	3.58
Arsenic	ND	40	3.26
Barium	8.9	1	.13
Beryllium	.0755F	1	.02
Cadmium	.262F	.5	.07
Calcium	177	100	1.99
Chromium	2.45F	20	.6
Cobalt	1.97F	10	.61
Copper	2.8	2	.74
Iron	1860	3	.72
Lead	7.15F	10	2.35
Magnesium	121	100	5.26
Manganese	25	2	.12
Molybdenum*	ND	3	.65
Nickel	2.15	2	.46
Potassium	265F	600	194
Silver	ND	3	1.41
Sodium	27.4	10	6.39
Vanadium	2.85	1	.83
Zinc	11.5	1	.26

RL: Reporting Limit
* Analyzed on 8/28/98 16:35 File I07H046

METHOD 3050B/6010B
METALS BY ICP

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
SDG NO.	: 98H132	Date Extracted:	08/27/98 18:30
Sample ID:	0052	Date Analyzed:	08/28/98 03:00
Lab Samp ID:	H132-29	Dilution Factor:	1
Lab File ID:	I07H045021	Matrix	: SOIL
Ext Btch ID:	IPH044S	% Moisture	: 21.2
Calib. Ref.:	I07H045019	Instrument ID	: EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	1210	22	6.24
Antimony	ND	10	3.58
Arsenic	ND	40	3.26
Barium	12.6	1	.13
Beryllium	.0892F	1	.02
Cadmium	.27F	.5	.07
Calcium	315	100	1.99
Chromium	2.65F	20	.6
Cobalt	1.27F	10	.61
Copper	2.93	2	.74
Iron	2350	3	.72
Lead	6.79F	10	2.35
Magnesium	140	100	5.26
Manganese	60.5	2	.12
Molybdenum	1.08F	3	.65
Nickel	1.94F	2	.46
Potassium	ND	600	194
Silver	ND	3	1.41
Sodium	15.1	10	6.39
Vanadium	2.66	1	.83
Zinc	14.7	1	.26

RL: Reporting Limit

METHOD 3050B/6010B
METALS BY ICP

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
SDG NO.	: 98H132	Date Extracted:	08/27/98 18:30
Sample ID:	0053	Date Analyzed:	08/28/98 03:04
Lab Samp ID:	H132-30	Dilution Factor:	1
Lab File ID:	I07H045022	Matrix	: SOIL
Ext Btch ID:	IPH044S	% Moisture	: 12.9
Calib. Ref.:	I07H045019	Instrument ID	: EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	1250	22	6.24
Antimony	ND	10	3.58
Arsenic	ND	40	3.26
Barium	13.3	1	.13
Beryllium	.0912F	1	.02
Cadmium	.291F	.5	.07
Calcium	315	100	1.99
Chromium	2.95F	20	.6
Cobalt	1.12F	10	.61
Copper	1.96F	2	.74
Iron	2670	3	.72
Lead	6.17F	10	2.35
Magnesium	149	100	5.26
Manganese	66.4	2	.12
Molybdenum	.96F	3	.65
Nickel	1.15F	2	.46
Potassium	ND	600	194
Silver	ND	3	1.41
Sodium	13.7	10	6.39
Vanadium	2.76	1	.83
Zinc	18.2	1	.26

RL: Reporting Limit

METHOD 3050B/6010B
METALS BY ICP

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
SDG NO. : 98H132	Date Extracted: 08/27/98 18:30
Sample ID: 0070	Date Analyzed: 08/28/98 03:08
Lab Samp ID: H132-31	Dilution Factor: 1
Lab File ID: I07H045023	Matrix : SOIL
Ext Btch ID: IPH044S	% Moisture : 14.4
Calib. Ref.: I07H045019	Instrument ID : EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	17300	22	6.24
Antimony	ND	10	3.58
Arsenic	ND	40	3.26
Barium	84.3	1	.13
Beryllium	.588F	1	.02
Cadmium	ND	.5	.07
Calcium	365	100	1.99
Chromium	20.1	20	.6
Cobalt	4.73F	10	.61
Copper	8.19	2	.74
Iron	19700	3	.72
Lead	14.7	10	2.35
Magnesium	1510	100	5.26
Manganese	178	2	.12
Molybdenum	1.78F	3	.65
Nickel	10.3	2	.46
Potassium	666	600	194
Silver	ND	3	1.41
Sodium	49.8	10	6.39
Vanadium	33.2	1	.83
Zinc	33.5	1	.26

RL: Reporting Limit

METHOD 3050B/6010B
METALS BY ICP

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
SDG NO. : 98H132	Date Extracted: 08/27/98 18:30
Sample ID: 0071	Date Analyzed: 08/28/98 03:34
Lab Samp ID: H132-32	Dilution Factor: 1
Lab File ID: I07H045027	Matrix : SOIL
Ext Btch ID: IPH044S	% Moisture : 12.9
Calib. Ref.: I07H045019	Instrument ID : EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	11900	22	6.24
Antimony	ND	10	3.58
Arsenic	ND	40	3.26
Barium	71	1	.13
Beryllium	.604F	1	.02
Cadmium	ND	.5	.07
Calcium	525	100	1.99
Chromium	13.6F	20	.6
Cobalt	5.42F	10	.61
Copper	6.75	2	.74
Iron	13100	3	.72
Lead	13.9	10	2.35
Magnesium	1150	100	5.26
Manganese	246	2	.12
Molybdenum	2.36F	3	.65
Nickel	8.91	2	.46
Potassium	647	600	194
Silver	ND	3	1.41
Sodium	13.7	10	6.39
Vanadium	22.5	1	.83
Zinc	34.9	1	.26

RL: Reporting Limit

METHOD 3050B/6010B
METALS BY ICP

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
SDG NO. : 98H132	Date Extracted: 08/27/98 18:30
Sample ID: 0072	Date Analyzed: 08/28/98 03:38
Lab Samp ID: H132-33	Dilution Factor: 1
Lab File ID: I07H045028	Matrix : SOIL
Ext Btch ID: IPH044S	% Moisture : 7.4
Calib. Ref.: I07H045019	Instrument ID : EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	4440	22	6.24
Antimony	ND	10	3.58
Arsenic	ND	40	3.26
Barium	20.7	1	.13
Beryllium	.119F	1	.02
Cadmium	.212F	.5	.07
Calcium	261	100	1.99
Chromium	7.3F	20	.6
Cobalt	1.05F	10	.61
Copper	3.11	2	.74
Iron	5710	3	.72
Lead	14.8	10	2.35
Magnesium	228	100	5.26
Manganese	19.2	2	.12
Molybdenum	.857F	3	.65
Nickel	3.43	2	.46
Potassium	ND	600	194
Silver	ND	3	1.41
Sodium	25.7	10	6.39
Vanadium	9.91	1	.83
Zinc	11.6	1	.26

RL: Reporting Limit

METHOD 3050B/6010B
METALS BY ICP

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
SDG NO.	: 98H132	Date Extracted:	08/27/98 18:30
Sample ID:	0073	Date Analyzed:	08/28/98 03:42
Lab Samp ID:	H132-34	Dilution Factor:	1
Lab File ID:	I07H045029	Matrix	: SOIL
Ext Btch ID:	IPH044S	% Moisture	: 10.7
Calib. Ref.:	I07H045019	Instrument ID	: EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	6460	22	6.24
Antimony	ND	10	3.58
Arsenic	ND	40	3.26
Barium	15.7	1	.13
Beryllium	.11F	1	.02
Cadmium	.17F	.5	.07
Calcium	166	100	1.99
Chromium	8.5F	20	.6
Cobalt	1.09F	10	.61
Copper	3.23	2	.74
Iron	7640	3	.72
Lead	9.19F	10	2.35
Magnesium	217	100	5.26
Manganese	9.64	2	.12
Molybdenum	1.32F	3	.65
Nickel	1.95F	2	.46
Potassium	ND	600	194
Silver	ND	3	1.41
Sodium	13.3	10	6.39
Vanadium	17	1	.83
Zinc	6.99	1	.26

RL: Reporting Limit

METHOD 3050B/6010B
METALS BY ICP

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
SDG NO. : 98H132	Date Extracted: 08/27/98 18:30
Sample ID: 0074	Date Analyzed: 08/28/98 03:46
Lab Samp ID: H132-35	Dilution Factor: 1
Lab File ID: I07H045030	Matrix : SOIL
Ext Btch ID: IPH044S	% Moisture : 3.5
Calib. Ref.: I07H045019	Instrument ID : EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	2540	22	6.24
Antimony	ND	10	3.58
Arsenic	ND	40	3.26
Barium	22.9	1	.13
Beryllium	.127F	1	.02
Cadmium	.152F	.5	.07
Calcium	168	100	1.99
Chromium	3.09F	20	.6
Cobalt	1.34F	10	.61
Copper	2.2	2	.74
Iron	2510	3	.72
Lead	3.99F	10	2.35
Magnesium	145	100	5.26
Manganese	74.7	2	.12
Molybdenum	ND	3	.65
Nickel	2.05	2	.46
Potassium	ND	600	194
Silver	ND	3	1.41
Sodium	48.3	10	6.39
Vanadium	5.36	1	.83
Zinc	12.1	1	.26

RL: Reporting Limit

METHOD 3050B/6010B
METALS BY ICP

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
SDG NO.	: 98H132	Date Extracted:	08/27/98 18:30
Sample ID:	0075	Date Analyzed:	08/28/98 04:07
Lab Samp ID:	H132-36	Dilution Factor:	1
Lab File ID:	I07H045033	Matrix	: SOIL
Ext Btch ID:	IPH044S	% Moisture	: 9.0
Calib. Ref.:	I07H045031	Instrument ID	: EMAXTI07

PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	7390	22	6.24
Antimony	ND	10	3.58
Arsenic	4.41F	40	3.26
Barium	35.9	1	.13
Beryllium	.253F	1	.02
Cadmium	.13F	.5	.07
Calcium	224	100	1.99
Chromium	20	20	.6
Cobalt	2.41F	10	.61
Copper	12.5	2	.74
Iron*	10200	3	.72
Lead	16.5	10	2.35
Magnesium	484	100	5.26
Manganese	148	2	.12
Molybdenum	2.45F	3	.65
Nickel	5.12	2	.46
Potassium	469F	600	194
Silver	1.64F	3	1.41
Sodium	8.72F	10	6.39
Vanadium	18.9	1	.83
Zinc	22.1	1	.26

RL: Reporting Limit
* Analyzed on 8/28/98 16:58 File I07H046

METHOD 3050B/6010B
METALS BY ICP

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Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
SDG NO.	: 98H132	Date Extracted:	08/27/98 18:30
Sample ID:	0076	Date Analyzed:	08/28/98 04:11
Lab Samp ID:	H132-37	Dilution Factor:	1
Lab File ID:	I07H045034	Matrix	: SOIL
Ext Btch ID:	IPH044S	% Moisture	: 5.8
Calib. Ref.:	I07H045031	Instrument ID	: EMAXTI07

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PARAMETERS	RESULTS (mg/kg)	RL (mg/kg)	MDL (mg/kg)
Aluminum	3650	22	6.24
Antimony	ND	10	3.58
Arsenic	ND	40	3.26
Barium	28.6	1	.13
Beryllium	.162F	1	.02
Cadmium	.141F	.5	.07
Calcium	156	100	1.99
Chromium	6.55F	20	.6
Cobalt	1.51F	10	.61
Copper	4.54	2	.74
Iron^	4020	3	.72
Lead	5.88F	10	2.35
Magnesium	221	100	5.26
Manganese	70.2	2	.12
Molybdenum	1.88F	3	.65
Nickel	2.75	2	.46
Potassium	ND	600	194
Silver	ND	3	1.41
Sodium	12.6	10	6.39
Vanadium	8.13	1	.83
Zinc	13.4	1	.26

RL: Reporting Limit
^ Analyzed on 8/28/98 17:02 File I07H046

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	DaTime Collcted	: 08/25/98
Project	: ANDREWS AFB / 765709	DaTime Received	: 08/27/98
Batch No.	: 98H133	DaTime Extrctd	: 08/27/98 15:00
Sample ID	: 0040	DaTime Analyzd	: 08/30/98 00:07
Lab Cnt NO.	: H133-01	Dilutn Factor	: 5
Lab File ID	: RHS360	Matrix	: WIPE
Ext Btch ID	: SVH026S	% Moisture	: NA
Calib. Ref.	: RHS354	Instrument ID	: T-004

PARAMETERS	RESULTS (ug)	PQL (ug)	MDL (ug)
Acenaphthene	ND	100	17.5
Acenaphthylene	ND	100	17
Anthracene	ND	100	11
Benzo(a)anthracene	79.9F	100	11.5
Benzo(a)pyrene	91.3F	100	6
Benzo(b)fluoranthene	156	100	10.5
Benzo(k)fluoranthene	ND	100	11.5
Benzo(g,h,i)perylene	40.7F	100	6.5
Chrysene	175	100	15
Dibenzo(a,h)anthracene	12.6F	100	5.5
Fluoranthene	339	100	13
Fluorene	ND	100	12.5
Indeno(1,2,3-cd)pyrene	45.4F	100	7
Naphthalene	ND	100	22.5
Phenanthrene	211	100	11
Pyrene	220	100	15

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-Fluorobiphenyl	40	34-135
Nitrobenzene-d5	41	25-135
Terphenyl-d14	71	32-136

PQL: Practical Quantitation Limit

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	DaTime Collcted	: 08/25/98
Project	: ANDREWS AFB / 765709	DaTime Received	: 08/27/98
Batch No.	: 98H133	DaTime Extrctd	: 08/27/98 15:00
Sample ID	: 0041	DaTime Analyzd	: 08/30/98 00:59
Lab Cnt NO.	: H133-02	Dilutn Factor	: 5
Lab File ID	: RHS361	Matrix	: WIPE
Ext Btch ID	: SVH026S	% Moisture	: NA
Calib. Ref.	: RHS354	Instrument ID	: T-004

PARAMETERS	RESULTS (ug)	PQL (ug)	MDL (ug)
Acenaphthene	ND	100	17.5
Acenaphthylene	ND	100	17
Anthracene	ND	100	11
Benzo(a)anthracene	18.3F	100	11.5
Benzo(a)pyrene	21.2F	100	6
Benzo(b)fluoranthene	38F	100	10.5
Benzo(k)fluoranthene	ND	100	11.5
Benzo(g,h,i)perylene	12.2F	100	6.5
Chrysene	47.7F	100	15
Dibenzo(a,h)anthracene	ND	100	5.5
Fluoranthene	75.9F	100	13
Fluorene	ND	100	12.5
Indeno(1,2,3-cd)pyrene	13.2F	100	7
Naphthalene	ND	100	22.5
Phenanthrene	56.8F	100	11
Pyrene	61.2F	100	15

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-Fluorobiphenyl	87	34-135
Nitrobenzene-d5	79	25-135
Terphenyl-d14	136	32-136

PQL: Practical Quantitation Limit

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	DaTime Collcted	: 08/25/98
Project	: ANDREWS AFB / 765709	DaTime Received	: 08/27/98
Batch No.	: 98H133	DaTime Extrctd	: 08/27/98 15:00
Sample ID	: 0042	DaTime Analyzd	: 08/30/98 01:51
Lab Cnt NO.	: H133-03	Dilutn Factor	: 2
Lab File ID	: RHS362	Matrix	: WIPE
Ext Btch ID	: SVH026S	% Moisture	: NA
Calib. Ref.	: RHS354	Instrument ID	: T-004

PARAMETERS	RESULTS (ug)	PQL (ug)	MDL (ug)
Acenaphthene	ND	40	7
Acenaphthylene	ND	40	6.8
Anthracene	ND	40	4.4
Benzo(a)anthracene	ND	40	4.6
Benzo(a)pyrene	2.9F	40	2.4
Benzo(b)fluoranthene	9.62F	40	4.2
Benzo(k)fluoranthene	ND	40	4.6
Benzo(g,h,i)perylene	ND	40	2.6
Chrysene	13F	40	6
Dibenzo(a,h)anthracene	ND	40	2.2
Fluoranthene	11F	40	5.2
Fluorene	ND	40	5
Indeno(1,2,3-cd)pyrene	ND	40	2.8
Naphthalene	ND	40	9
Phenanthrene	8.43F	40	4.4
Pyrene	11.3F	40	6

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-Fluorobiphenyl	50	34-135
Nitrobenzene-d5	46	25-135
Terphenyl-d14	61	32-136

PQL: Practical Quantitation Limit

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	DaTime Collcted	: 08/25/98
Project	: ANDREWS AFB / 765709	DaTime Received	: 08/27/98
Batch No.	: 98H133	DaTime Extrctd	: 08/27/98 15:00
Sample ID	: 0043	DaTime Analyzd	: 08/30/98 02:43
Lab Cnt NO.	: H133-04	Dilutn Factor	: 1
Lab File ID	: RHS363	Matrix	: WIPE
Ext Btch ID	: SVH026S	% Moisture	: NA
Calib. Ref.	: RHS354	Instrument ID	: T-004

PARAMETERS	RESULTS (ug)	PQL (ug)	MDL (ug)
Acenaphthene	ND	20	3.5
Acenaphthylene	ND	20	3.4
Anthracene	ND	20	2.2
Benzo(a)anthracene	ND	20	2.3
Benzo(a)pyrene	2.25F	20	1.2
Benzo(b)fluoranthene	4.05F	20	2.1
Benzo(k)fluoranthene	ND	20	2.3
Benzo(g,h,i)perylene	1.35F	20	1.3
Chrysene	5.56F	20	3
Dibenzo(a,h)anthracene	ND	20	1.1
Fluoranthene	9.06F	20	2.6
Fluorene	ND	20	2.5
Indeno(1,2,3-cd)pyrene	ND	20	1.4
Naphthalene	ND	20	4.5
Phenanthrene	8.99F	20	2.2
Pyrene	8.49F	20	3

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-Fluorobiphenyl	53	34-135
Nitrobenzene-d5	42	25-135
Terphenyl-d14	72	32-136

PQL: Practical Quantitation Limit

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	DaTime Collcted:	08/25/98
Project	: ANDREWS AFB / 765709	DaTime Received:	08/27/98
Batch No.	: 98H133	DaTime Extrctd :	08/27/98 15:00
Sample ID	: 0044	DaTime Analyzd :	08/30/98 03:35
Lab Cnt NO.:	H133-05	Dilutn Factor :	2
Lab File ID:	RHS364	Matrix :	WIPE
Ext Btch ID:	SVH026S	% Moisture :	NA
Calib. Ref.:	RHS354	Instrument ID :	T-004

PARAMETERS	RESULTS (ug)	PQL (ug)	MDL (ug)
Acenaphthene	ND	40	7
Acenaphthylene	ND	40	6.8
Anthracene	ND	40	4.4
Benzo(a)anthracene	5.91F	40	4.6
Benzo(a)pyrene	6.57F	40	2.4
Benzo(b)fluoranthene	12.2F	40	4.2
Benzo(k)fluoranthene	ND	40	4.6
Benzo(g,h,i)perylene	3.71F	40	2.6
Chrysene	15F	40	6
Dibenzo(a,h)anthracene	ND	40	2.2
Fluoranthene	25.3F	40	5.2
Fluorene	ND	40	5
Indeno(1,2,3-cd)pyrene	3.95F	40	2.8
Naphthalene	ND	40	9
Phenanthrene	23F	40	4.4
Pyrene	21.2F	40	6

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-Fluorobiphenyl	102	34-135
Nitrobenzene-d5	92	25-135
Terphenyl-d14	109	32-136

PQL: Practical Quantitation Limit

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	DaTime Collcted	: 08/25/98
Project	: ANDREWS AFB / 765709	DaTime Received	: 08/27/98
Batch No.	: 98H133	DaTime Extrctd	: 08/27/98 15:00
Sample ID	: 0045	DaTime Analyzd	: 08/30/98 04:26
Lab Cnt NO.	: H133-06	Dilutn Factor	: 2
Lab File ID	: RHS365	Matrix	: WIPE
Ext Btch ID	: SVH026S	% Moisture	: NA
Calib. Ref.	: RHS354	Instrument ID	: T-004

PARAMETERS	RESULTS (ug)	PQL (ug)	MDL (ug)
Acenaphthene	ND	40	7
Acenaphthylene	ND	40	6.8
Anthracene	ND	40	4.4
Benzo(a)anthracene	13.4F	40	4.6
Benzo(a)pyrene	8.94F	40	2.4
Benzo(b)fluoranthene	13.2F	40	4.2
Benzo(k)fluoranthene	ND	40	4.6
Benzo(g,h,i)perylene	4.18F	40	2.6
Chrysene	15.9F	40	6
Dibenzo(a,h)anthracene	ND	40	2.2
Fluoranthene	29.9F	40	5.2
Fluorene	ND	40	5
Indeno(1,2,3-cd)pyrene	4.51F	40	2.8
Naphthalene	ND	40	9
Phenanthrene	21.4F	40	4.4
Pyrene	26F	40	6

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-Fluorobiphenyl	104	34-135
Nitrobenzene-d5	91	25-135
Terphenyl-d14	111	32-136

PQL: Practical Quantitation Limit

SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	DaTime Collcted	: NA
Project	: ANDREWS AFB / 765709	DaTime Received	: 08/27/98
Batch No.	: 98H133	DaTime Extrctd	: 08/27/98 15:00
Sample ID	: MBLK1S	DaTime Analyzd	: 08/28/98 17:35
Lab Cnt NO.	: SVH026SB	Dilutn Factor	: 1
Lab File ID	: RHB456	Matrix	: WIPE
Ext Btch ID	: SVH026S	% Moisture	: NA
Calib. Ref.	: RHB455	Instrument ID	: T-003

PARAMETERS	RESULTS (ug)	PQL (ug)	MDL (ug)
Acenaphthene	ND	20	3.5
Acenaphthylene	ND	20	3.4
Anthracene	ND	20	2.2
Benzo(a)anthracene	ND	20	2.3
Benzo(a)pyrene	ND	20	1.2
Benzo(b)fluoranthene	ND	20	2.1
Benzo(k)fluoranthene	ND	20	2.3
Benzo(g,h,i)perylene	ND	20	1.3
Chrysene	ND	20	3
Dibenzo(a,h)anthracene	ND	20	1.1
Fluoranthene	ND	20	2.6
Fluorene	ND	20	2.5
Indeno(1,2,3-cd)pyrene	ND	20	1.4
Naphthalene	ND	20	4.5
Phenanthrene	ND	20	2.2
Pyrene	ND	20	3

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-Fluorobiphenyl	65	34-135
Nitrobenzene-d5	56	25-135
Terphenyl-d14	77	32-136

PQL: Practical Quantitation Limit

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
Se No.	: 98H132	Date Extracted:	08/27/98 12:30
Sa. ID:	0031	Date Analyzed:	08/29/98 22:08
Lab Samp ID:	H132-14	Dilution Factor:	10
Lab File ID:	RHB490	Matrix	: SOIL
Ext Btch ID:	SVH025S	% Moisture	: 0.5
Calib. Ref.:	RHB485	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	ND U	7000	1040
ACENAPHTHYLENE	ND U	7000	1030
ANTHRACENE ~~R16~~ J15 9/5/98	2240F	7000	670
BENZO(A)ANTHRACENE	9750	7000	690
BENZO(A)PYRENE ~~R16~~ J15 9/5/98	6730F	7000	370
BENZO(B)FLUORANTHENE	12500	7000	640
BENZO(K)FLUORANTHENE	ND U	7000	680
BENZO(G,H,I)PERYLENE ~~R16~~ J15 9/5/98	2230F	7000	410
CHRYSENE	9570	7000	900
DIBENZO(A,H)ANTHRACENE	ND U	7000	320
FLUORANTHENE	25400	7000	770
FLUORENE ~~R16~~ J15 9/5/98	1250F	7000	740
INDENO(1,2,3-CD)PYRENE ~~R16~~ J15	2620F	7000	420
NAPHTHALENE uJ08A	ND	7000	1350
PHENANTHRENE	15800	7000	660
PYRENE	18800	7000	900

S ATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	87	34-135
NITROBENZENE-D5	51	25-135
TERPHENYL-D14	88	32-136

PQL: Practical Quantitation Limit

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
Batch No. : 98H132	Date Extracted: 08/27/98 12:30
S ID: 0032	Date Analyzed: 08/29/98 23:01
Lab Samp ID: H132-15	Dilution Factor: 10
Lab File ID: RHB491	Matrix : SOIL
Ext Btch ID: SVH025S	% Moisture : 0.4
Calib. Ref.: RHB485	Instrument ID : T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	ND U	7000	1040
ACENAPHTHYLENE	ND	7000	1030
ANTHRACENE R16JLS 9/5/98	1750F	7000	670
BENZO(A)ANTHRACENE	11700	7000	690
BENZO(A)PYRENE	9070	7000	370
BENZO(B)FLUORANTHENE	17700	7000	640
BENZO(K)FLUORANTHENE 9/5/98	ND U	7000	680
BENZO(G,H,I)PERYLENE R16JLS	3000F	7000	410
CHRYSENE	12200	7000	900
DIBENZO(A,H)ANTHRACENE	ND U	7000	320
FLUORANTHENE 9/5/98	34000	7000	770
FLUORENE R16JLS	943F	7000	740
INDENO(1,2,3-CD)PYRENE R16JLS	3480F	7000	420
NAPHTHALENE UJ08A	ND	7000	1350
PHENANTHRENE	18600	7000	660
PYRENE	23100	7000	900

S GATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	73	34-135
NITROBENZENE-D5	35	25-135
TERPHENYL-D14	54	32-136

PQL: Practical Quantitation Limit

3019

SW 3550A/8270C

SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
Batch No.	: 98H132	Date Extracted:	08/27/98 18:00
[illegible] ID:	0033	Date Analyzed:	08/29/98 23:53
Lab Samp ID:	H132-16	Dilution Factor:	10
Lab File ID:	RHB492	Matrix	: SOIL
Ext Btch ID:	SVH028S	% Moisture	: 0.7
Calib. Ref.:	RHB485	Instrument ID	: T-003

PARAMETERS		RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	UJ08A	ND	7000	1040
ACENAPHTHYLENE		ND	7000	1030
ANTHRACENE	sjm 9/5/98	ND U	7000	670
BENZO(A)ANTHRACENE	RH J15	4300F	7000	690
BENZO(A)PYRENE		3420F	7000	370
BENZO(B)FLUORANTHENE		6890F	7000	640
BENZO(K)FLUORANTHENE		ND U	7000	680
BENZO(G,H,I)PERYLENE	J15	1530F	7000	410
CHRYSENE	J15	5130F	7000	900
DIBENZO(A,H)ANTHRACENE		ND U	7000	320
FLUORANTHENE		13100	7000	770
FLUORENE		ND U	7000	740
INDENO(1,2,3-CD)PYRENE	J15	1630F	7000	420
NAPHTHALENE	UJ08A	ND	7000	1350
PHENANTHRENE		7870	7000	660
PYRENE		9550	7000	900

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	85	34-135
NITROBENZENE-D5	47	25-135
TERPHENYL-D14	66	32-136

PQL: Practical Quantitation Limit

3020

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
B[illegible] No.	: 98H132	Date Extracted:	08/27/98 18:00
S[illegible] ID:	0034	Date Analyzed:	08/30/98 00:46
Lab Samp ID:	H132-17	Dilution Factor:	10
Lab File ID:	RHB493	Matrix	: SOIL
Ext Btch ID:	SVH028S	% Moisture	: 0.7
Calib. Ref.:	RHB485	Instrument ID	: T-003

PARAMETERS		RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	UJ08A	ND	7000	1040
ACENAPHTHYLENE	↓ ↓	ND	7000	1030
ANTHRACENE		ND U	7000	670
BENZO(A)ANTHRACENE	J15	1250F	7000	690
BENZO(A)PYRENE	J15	1170F	7000	370
BENZO(B)FLUORANTHENE	J15	2250F	7000	640
BENZO(K)FLUORANTHENE		ND U	7000	680
BENZO(G,H,I)PERYLENE		ND U	7000	410
CHRYSENE	J15	1780F	7000	900
DIBENZO(A,H)ANTHRACENE		ND U	7000	320
FLUORANTHENE	J15	3220F	7000	770
FLUORENE		ND U	7000	740
INDENO(1,2,3-CD)PYRENE		ND U	7000	420
NAPHTHALENE	UJ08A	ND	7000	1350
PHENANTHRENE	J15	2600F	7000	660
PYRENE	↓	3390F	7000	900

S[illegible]GATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	109	34-135
NITROBENZENE-D5	75	25-135
TERPHENYL-D14	103	32-136

PQL: Practical Quantitation Limit

3021

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
B[illegible] No. : 98H132	Date Extracted: 08/27/98 18:00
S[illegible]e ID: 0035	Date Analyzed: 08/30/98 01:38
Lab Samp ID: H132-18	Dilution Factor: 5
Lab File ID: RHB494	Matrix : SOIL
Ext Btch ID: SVH028S	% Moisture : 2.0
Calib. Ref.: RH8485	Instrument ID : T-003

PARAMETERS		RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	UJ 08A	ND	3500	520
ACENAPHTHYLENE		ND	3500	515
ANTHRACENE	J 15	357F	3500	335
BENZO(A)ANTHRACENE		2810F	3500	345
BENZO(A)PYRENE		2770F	3500	185
BENZO(B)FLUORANTHENE		6570	3500	320
BENZO(K)FLUORANTHENE		ND U	3500	340
BENZO(G,H,I)PERYLENE	J 15	1560F	3500	205
CHRYSENE		4490	3500	450
DIBENZO(A,H)ANTHRACENE		ND U	3500	160
FLUORANTHENE		8800	3500	385
FLUORENE		ND U	3500	370
INDENO(1,2,3-CD)PYRENE	J 15	1570F	3500	210
NAPHTHALENE	UJ 08A	ND	3500	675
PHENANTHRENE		5320	3500	330
PYRENE		7200	3500	450

[illegible]GATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	55	34-135
NITROBENZENE-D5	31	25-133
TERPHENYL-D14	58	32-136

PQL: Practical Quantitation Limit

3022

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
P[illegible]h No. : 98H132	Date Extracted: 08/27/98 18:00
[illegible]le ID: 0036	Date Analyzed: 08/30/98 02:31
Lab Samp ID: H132-19	Dilution Factor: 10
Lab File ID: RHB495	Matrix : SOIL
Ext Btch ID: SVH028S	% Moisture : 2.6
Calib. Ref.: RHB485	Instrument ID : T-003

PARAMETERS		RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	UJ OBA	ND	7000	1040
ACENAPHTHYLENE		ND	7000	1030
ANTHRACENE	J LS	805F	7000	670
BENZO(A)ANTHRACENE		3200F	7000	690
BENZO(A)PYRENE		2410F	7000	370
BENZO(B)FLUORANTHENE		4150F	7000	640
BENZO(K)FLUORANTHENE		ND U	7000	680
BENZO(G,H,I)PERYLENE		ND U	7000	410
CHRYSENE	J LS	3380F	7000	900
DIBENZO(A,H)ANTHRACENE		ND U	7000	320
FLUORANTHENE	J LS	6900F	7000	770
FLUORENE		ND U	7000	740
INDENO(1,2,3-CD)PYRENE	J LS	1060F	7000	420
NAPHTHALENE	UJ OBA	ND	7000	1350
PHENANTHRENE	J LS	5040F	7000	660
PYRENE		6290F	7000	700

[illegible]OGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	117	34-135
NITROBENZENE-D5	81	25-135
TERPHENYL-D14	105	32-136

PQL: Practical Quantitation Limit

3023

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
P[illegible] No.	: 98H132	Date Extracted:	08/27/98 18:00
S[illegible]e ID:	0037	Date Analyzed:	08/30/98 03:23
Lab Samp ID:	H132-20	Dilution Factor:	10
Lab File ID:	RHB496	Matrix	: SOIL
Ext Btch ID:	SVH028S	% Moisture	: 7.9
Calib. Ref.:	RHB485	Instrument ID	: T-003

PARAMETERS		RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	UJ 08A	ND	7000	1040
ACENAPHTHYLENE	↓ ↓	ND	7000	1030
ANTHRACENE		ND U	7000	670
BENZO(A)ANTHRACENE	J 15	2270F	7000	690
BENZO(A)PYRENE	J 15	1980F	7000	370
BENZO(B)FLUORANTHENE	J 15	3620F	7000	640
BENZO(K)FLUORANTHENE		ND U	7000	680
BENZO(G,H,I)PERYLENE		ND U	7000	410
CHRYSENE	J 15	2960F	7000	900
DIBENZO(A,H)ANTHRACENE		ND U	7000	320
FLUORANTHENE	J 15	5810F	7000	770
FLUORENE		ND U	7000	740
INDENO(1,2,3-CD)PYRENE		ND U	7000	420
NAPHTHALENE	UJ 08A	ND	7000	1350
PHENANTHRENE	J 15	4150F	7000	660
PYRENE	↓ ↓	5350F	7000	900

[illegible]OGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	112	34-135
NITROBENZENE-D5	77	25-135
TERPHENYL-D14	104	32-136

PQL: Practical Quantitation Limit

3024

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
P[illegible] No.	: 98H132	Date Extracted:	08/27/98 18:00
S[illegible]e ID:	0038	Date Analyzed:	08/30/98 04:16
Lab Samp ID:	H132-21	Dilution Factor:	5
Lab File ID:	RHB497	Matrix	: SOIL
Ext Btch ID:	SVH028S	% Moisture	: 1.8
Calib. Ref.:	RHB485	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE UJ 08A	ND	3500	520
ACENAPHTHYLENE	ND	3500	515
ANTHRACENE J 15	754F	3500	335
BENZO(A)ANTHRACENE	4590	3500	345
BENZO(A)PYRENE	4650	3500	185
BENZO(B)FLUORANTHENE	10100	3500	320
BENZO(K)FLUORANTHENE	ND U	3500	340
BENZO(G,H,I)PERYLENE J 15	2170F	3500	205
CHRYSENE	6140	3500	450
DIBENZO(A,H)ANTHRACENE	ND U	3500	160
FLUORANTHENE	15400	3500	385
FLUORENE J 15	596F	3500	370
INDENO(1,2,3-CD)PYRENE J 15	2180F	3500	210
NAPHTHALENE UJ 08A	ND	3500	675
PHENANTHRENE	9560	3500	330
PYRENE	11900	3500	450

OGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	61	34-135
NITROBENZENE-D5	40	25-135
TERPHENYL-D14	72	32-136

PQL: Practical Quantitation Limit

3025

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client : IT CORPORATION	Date Collected: 08/25/98
Project : ANDREWS AFB / 765709	Date Received: 08/27/98
P[illegible] No. : 98H132	Date Extracted: 08/27/98 18:00
[illegible] ID: 0039	Date Analyzed: 08/30/98 05:08
Lab Samp ID: H132-22	Dilution Factor: 5
Lab File ID: RH8498	Matrix : SOIL
Ext Btch ID: SVH028S	% Moisture : 2.0
Calib. Ref.: RH8485	Instrument ID : T-003

PARAMETERS		RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	UJ 08A	ND	3500	520
ACENAPHTHYLENE	↓ ↓	ND	3500	515
ANTHRACENE	J 15	400F	3500	335
BENZO(A)ANTHRACENE	↓ ↓	2030F	3500	345
BENZO(A)PYRENE	↓ ↓	2100F	3500	185
BENZO(B)FLUORANTHENE		4380	3500	320
BENZO(K)FLUORANTHENE		ND U	3500	340
BENZO(G,H,I)PERYLENE	J 15	942F	3500	205
CHRYSENE	J 15	2860F	3500	450
DIBENZO(A,H)ANTHRACENE		ND U	3500	160
FLUORANTHENE		6870	3500	385
FLUORENE	J 15	447F	3500	370
INDENO(1,2,3-CD)PYRENE	J 15	924F	3500	210
NAPHTHALENE	UJ08A	ND	3500	675
PHENANTHRENE		5360	3500	330
PYRENE		5680	3500	450

OGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	67	34-135
NITROBENZENE-D5	44	25-135
TERPHENYL-D14	76	32-136

PQL: Practical Quantitation Limit

3026

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
..ch No.	: 98H132	Date Extracted:	08/27/98 18:00
..ple ID:	0046	Date Analyzed:	08/29/98 13:28
Lab Samp ID:	H132-23	Dilution Factor:	5
Lab File ID:	RHB480	Matrix	: SOIL
Ext Btch ID:	SVH028S	% Moisture	: 31.5
Calib. Ref.:	RHB471	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE UJ 08A	ND	3500	520
ACENAPHTHYLENE	ND	3500	515
ANTHRACENE	ND U	3500	335
BENZO(A)ANTHRACENE J 15	764F	3500	345
BENZO(A)PYRENE J 15	611F	3500	185
BENZO(B)FLUORANTHENE J 15	1160F	3500	320
BENZO(K)FLUORANTHENE	ND U	3500	340
BENZO(G,H,I)PERYLENE	ND U	3500	205
CHRYSENE J 15	794F	3500	450
DIBENZO(A,H)ANTHRACENE	ND U	3500	160
FLUORANTHENE J 15	1320F	3500	385
FLUORENE	ND U	3500	370
INDENO(1,2,3-CD)PYRENE	ND U	3500	210
NAPHTHALENE UJ 08A qualaliq	ND	3500	675
PHENANTHRENE J ~~1K~~, 15	813F	3500	330
PYRENE J 15	1760F	3500	450

..ROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	48	34-135
NITROBENZENE-D5	25	25-135
TERPHENYL-D14	79	32-136

PQL: Practical Quantitation Limit

SW 3550A/8270C

SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
8 . No.	: 98H132	Date Extracted:	08/27/98 18:00
S. .e ID:	0047	Date Analyzed:	08/29/98 21:32
Lab Samp ID:	H132-24	Dilution Factor:	2
Lab File ID:	RHS357	Matrix	: SOIL
Ext Btch ID:	SVH028S	% Moisture	: 57.8
Calib. Ref.:	RHS354	Instrument ID	: T-004

PARAMETERS		RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	UJ 08A	ND	1400	208
ACENAPHTHYLENE		ND	1400	206
ANTHRACENE	J 15	256F	1400	134
BENZO(A)ANTHRACENE		802F	1400	138
BENZO(A)PYRENE		663F	1400	74
BENZO(B)FLUORANTHENE		884F	1400	128
BENZO(K)FLUORANTHENE		ND U	1400	136
BENZO(G,H,I)PERYLENE	J 15	350F	1400	82
CHRYSENE		850F	1400	180
DIBENZO(A,H)ANTHRACENE		91.6F	1400	64
FLUORANTHENE		1650	1400	154
FLUORENE		ND U	1400	148
INDENO(1,2,3-CD)PYRENE	J 15	359F	1400	84
NAPHTHALENE	UJ 08A	ND	1400	270
PHENANTHRENE	~~J 17~~ 9/9/98	1500	1400	132
PYRENE		1710	1400	180

..OGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	100	34-135
NITROBENZENE-D5	91	25-135
TERPHENYL-D14	105	32-136

PQL: Practical Quantitation Limit

3028

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
B No.	: 98H132	Date Extracted:	08/27/98 18:00
Sample ID:	0048	Date Analyzed:	08/28/98 23:43
Lab Samp ID:	H132-25	Dilution Factor:	1
Lab File ID:	RH8463	Matrix	: SOIL
Ext Btch ID:	SVH028S	% Moisture	: 33.4
Calib. Ref.:	RH8455	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE UJ 08A	ND	700	104
ACENAPHTHYLENE	ND	700	103
ANTHRACENE	ND U	700	67
BENZO(A)ANTHRACENE	ND	700	69
BENZO(A)PYRENE	ND	700	37
BENZO(B)FLUORANTHENE	ND	700	64
BENZO(K)FLUORANTHENE	ND	700	68
BENZO(G,H,I)PERYLENE	ND	700	41
CHRYSENE	ND	700	90
DIBENZO(A,H)ANTHRACENE	ND	700	32
FLUORANTHENE	ND	700	77
FLUORENE	ND	700	74
INDENO(1,2,3-CD)PYRENE	ND	700	42
NAPHTHALENE UJ 08A	ND	700	135
PHENANTHRENE	ND U	700	66
PYRENE	ND	700	90

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	57	34-135
NITROBENZENE-D5	45	25-135
TERPHENYL-D14	66	32-136

PQL: Practical Quantitation Limit

SW 3550A/8270C

SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
B No.	: 98H132	Date Extracted:	08/27/98 18:00
Sample ID	: 0049	Date Analyzed:	08/29/98 00:35
Lab Samp ID	: H132-26	Dilution Factor:	1
Lab File ID	: RHB464	Matrix	: SOIL
Ext Btch ID	: SVH028S	% Moisture	: 21.8
Calib. Ref.	: RHB455	Instrument ID	: T-003

PARAMETERS		RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	UJ 08A	ND	700	104
ACENAPHTHYLENE	↓ ↓	ND	700	103
ANTHRACENE		ND U	700	67
BENZO(A)ANTHRACENE	J 15	124F	700	69
BENZO(A)PYRENE	J 15	99F	700	37
BENZO(B)FLUORANTHENE	J 15	164F	700	64
BENZO(K)FLUORANTHENE		ND U	700	68
BENZO(G,H,I)PERYLENE		ND U	700	41
CHRYSENE	J 15	115F	700	90
DIBENZO(A,H)ANTHRACENE		ND U	700	32
FLUORANTHENE	J 15	154F	700	77
FLUORENE		ND U	700	74
INDENO(1,2,3-CD)PYRENE		ND U	700	42
NAPHTHALENE	UJ 08A	ND	700	135
PHENANTHRENE	J 15	111F	700	66
PYRENE	↓ ↓	227F	700	90

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	55	34-135
NITROBENZENE-D5	44	25-135
TERPHENYL-D14	66	32-136

PQL: Practical Quantitation Limit

3030

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
F No.	: 98H132	Date Extracted:	08/27/98 18:00
Sample ID:	0050	Date Analyzed:	08/29/98 22:24
Lab Samp ID:	H132-27	Dilution Factor:	1
Lab File ID:	RHS358	Matrix	: SOIL
Ext Btch ID:	SVH028S	% Moisture	: 19.0
Calib. Ref.:	RHS354	Instrument ID	: T-004

PARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE UJ 08A	ND	700	104
ACENAPHTHYLENE	ND	700	103
ANTHRACENE	ND U	700	67
BENZO(A)ANTHRACENE	ND	700	69
BENZO(A)PYRENE	ND	700	37
BENZO(B)FLUORANTHENE	ND	700	64
BENZO(K)FLUORANTHENE	ND	700	68
BENZO(G,H,I)PERYLENE	ND	700	41
CHRYSENE	ND	700	90
DIBENZO(A,H)ANTHRACENE	ND	700	32
FLUORANTHENE	ND	700	77
FLUORENE	ND	700	74
INDENO(1,2,3-CD)PYRENE	ND	700	42
NAPHTHALENE UJ 08A	ND UJ08A	700	135
PHENANTHRENE	ND U	700	66
PYRENE	ND	700	90

OGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	60	34-135
NITROBENZENE-D5	52	25-135
TERPHENYL-D14	63	32-136

PQL: Practical Quantitation Limit

3031

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

lient : IT CORPORATION	Date Collected: 08/25/98
roject : ANDREWS AFB / 765709	Date Received: 08/27/98
' lo. : 98H132	Date Extracted: 08/27/98 18:00
am... ID: 0051	Date Analyzed: 08/29/98 01:28
ab Samp ID: H132-28	Dilution Factor: 1
ab File ID: RHB465	Matrix : SOIL
xt Btch ID: SVH028S	% Moisture : 20.5
alib. Ref.: RHB455	Instrument ID : T-003

ARAMETERS	RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE UJ 08A	ND	700	104
ACENAPHTHYLENE	ND	700	103
ANTHRACENE	ND U	700	67
BENZO(A)ANTHRACENE	ND	700	69
BENZO(A)PYRENE	ND	700	37
BENZO(B)FLUORANTHENE	ND	700	64
BENZO(K)FLUORANTHENE	ND	700	68
BENZO(G,H,I)PERYLENE	ND	700	41
CHRYSENE	ND	700	90
DIBENZO(A,H)ANTHRACENE	ND	700	32
FLUORANTHENE	ND	700	77
FLUORENE	ND	700	74
INDENO(1,2,3-CD)PYRENE	ND	700	42
NAPHTHALENE UJ08A	ND	700	135
PHENANTHRENE	ND U	700	66
PYRENE	ND	700	90

S. ATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	61	34-135
NITROBENZENE-D5	48	25-135
TERPHENYL-D14	70	32-136

PQL: Practical Quantitation .imit

3032

SW 3550A/8270C
SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
[illegible] No.	: 98H132	Date Extracted:	08/27/98 18:00
Sample ID	: 0052	Date Analyzed:	08/29/98 15:14
Lab Samp ID	: H132-29	Dilution Factor:	1
Lab File ID	: RH8482	Matrix	: SOIL
Ext Btch ID	: SVH028S	% Moisture	: 21.2
Calib. Ref.	: RH8471	Instrument ID	: T-003

PARAMETERS		RESULTS (ug/kg)		RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	UJ 08A	ND		700	104
ACENAPHTHYLENE		ND		700	103
ANTHRACENE		ND	U	700	67
BENZO(A)ANTHRACENE		ND		700	69
BENZO(A)PYRENE		ND		700	37
BENZO(B)FLUORANTHENE		ND		700	64
BENZO(K)FLUORANTHENE		ND		700	68
BENZO(G,H,I)PERYLENE		ND		700	41
CHRYSENE		ND		700	90
DIBENZO(A,H)ANTHRACENE		ND		700	32
FLUORANTHENE		ND		700	77
FLUORENE		ND		700	74
INDENO(1,2,3-CD)PYRENE		ND		700	42
NAPHTHALENE	UJ08A	ND		700	135
PHENANTHRENE		ND	UA	700	66
PYRENE		ND	U	700	90

SURROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	44	34-135
NITROBENZENE-D5	33	25-135
TERPHENYL-D14	61	32-136

PQL: Practical Quantitation Limit

3033

SW 3550A/8270C

SEMI VOLATILE ORGANICS BY GC/MS

Client	: IT CORPORATION	Date Collected:	08/25/98
Project	: ANDREWS AFB / 765709	Date Received:	08/27/98
h No.	: 98H132	Date Extracted:	08/27/98 18:00
ple ID:	0053	Date Analyzed:	08/29/98 23:15
Lab Samp ID:	H132-30	Dilution Factor:	1
Lab File ID:	RHS359	Matrix	: SOIL
Ext Btch ID:	SVH028S	% Moisture	: 12.9
Calib. Ref.:	RHS354	Instrument ID	: T-004

PARAMETERS		RESULTS (ug/kg)	RL (ug/kg)	MDL (ug/kg)
ACENAPHTHENE	UJ 08A	ND	700	104
ACENAPHTHYLENE		ND	700	103
ANTHRACENE		ND U	700	67
BENZO(A)ANTHRACENE		ND	700	69
BENZO(A)PYRENE		ND	700	37
BENZO(B)FLUORANTHENE		ND	700	64
BENZO(K)FLUORANTHENE		ND	700	68
BENZO(G,H,I)PERYLENE		ND	700	41
CHRYSENE		ND	700	90
DIBENZO(A,H)ANTHRACENE		ND	700	32
FLUORANTHENE		ND	700	77
FLUORENE		ND	700	74
INDENO(1,2,3-CD)PYRENE		ND	700	42
NAPHTHALENE	UJ08A	ND	700	135
PHENANTHRENE		ND U	700	66
PYRENE		ND	700	90

ROGATE PARAMETERS	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	36	34-135
NITROBENZENE-D5	32	25-135
TERPHENYL-D14	46	32-136

PQL: Practical Quantitation Limit

3034

METHOD 3050B/6010B
LEAD BY ICP

CLIENT:	IT CORPORATION	DATE COLLECTED:	08/25/98
PROJECT:	ANDREWS AFB / 765709	DATE RECEIVED:	08/27/98
BATCH NO.:	98H133	DATE EXTRACTED:	08/27/98 15:00
MATRIX:	WIPE	INSTRUMENT ID:	TI002
CAL REF:	I07H04539	PREP BATCH:	IPH043S

SAMPLE ID	CONTROL NO	RESULT (ug)	DILUTION FACTOR	RL (ug)	MDL (ug)	ANALYZED DATETIME
0040	H133-01	ND	1	10	2.35	08/28/98 05:15
0041	H133-02	6.23F	1	10	2.35	08/28/98 05:19
0042	H133-03	2.45F	1	10	2.35	08/28/98 05:23
0043	H133-04	4.04F	1	10	2.35	08/28/98 05:27
0044	H133-05	3.46F	1	10	2.35	08/28/98 05:31
0045	H133-06	4.71F	1	10	2.35	08/28/98 05:35
MBLK1S	IPH043SB	ND	1	10	2.35	08/28/98 04:56
LCS1S	IPH043SL	90	1	10	2.35	08/28/98 05:00
LCD1S	IPH043SC	91	1	10	2.35	08/28/98 05:04

RL: Reporting Limit

EMAX QUALITY CONTROL DATA
LCS/LCD ANALYSIS

CLIENT: IT CORPORATION
PROJECT: ANDREWS AFB / 765709
METHOD: METHOD 3050B/6010B
MATRIX: WIPE
% MOISTURE: NA

BATCH NO.: 98H133
SAMPLE ID: LCS1S/LCD1S
CONTROL NO.: IPH043SL/C

DATE RECEIVED: 08/27/98
DATE EXTRACTED: 08/27/98 15:00
DATE ANALYZED: 08/28/98 05:00/05:04

ACCESSION:

PARAMETER	BLNK RSLT (ug)	SPIKE AMT (ug)	BS RSLT (ug)	BS % REC	SPIKE AMT (ug)	BSD RSLT (ug)	BSD % REC	RPD %	QC LIMIT %	RPD LIMIT %
Lead	ND	100.00	90.00	90	100.00	91.00	91	1	75-125	20

APPENDIX K

EPA EXTENSION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP 15 1998

Brigadier General Gilbert J. Regan
Staff Judge Advocate
402 Scott Drive Unit 3L2
Scott AFB, IL 62225-5305

Dear Brigadier General Regan:

I am writing in response to your letter of August 28, 1998, requesting an extension of the public comment period for the Andrews Air Force Base and Brandywine Defense Reutilization and Marketing Office sites, Maryland. These sites were proposed to the National Priorities List (NPL) on July 28, 1998. EPA has learned that the documentation records for these sites contained minor errors in citing references and were incomplete once the public comment period began. Because of the extra time it took to compile a complete copy of the documentation records, we will grant a 2-week extension of the comment period for both of these sites. Please note that this extension has been granted only for the above reasons, as the Agency has found that your concerns regarding data quality and the time and effort expended in reviewing "the sheer volume of materials" in documentation records do not warrant an extension.

EPA will evaluate all comments that are received on or before October 12, 1998. If you would like to submit any comments, please do so within this time frame. Please send one original and three copies of comments to the following address:

Docket Coordinator, Headquarters
U.S. EPA CERCLA Docket Office, Mail Code 5201G
401 M Street, SW
Washington, DC 20460

All comments will be addressed, and their impacts on the score calculated, before a final decision is reached on whether the Andrews Air Force Base and Brandywine Defense Reutilization and Marketing Office sites should be placed on the NPL. EPA's responses to all comments regarding these sites will be provided in a "Support Document" which will be available to the public at the time a final decision is made. I hope this addresses your concerns.

Sincerely,

David Evans

David Evans, Director
State, Tribal & Site
Identification Center